THE JOURNAL OF GAS LIGHTING
WATER SUPPLY & SANITARY IMPROVEMENT

VOL. LXV. No. 1658.] LONDON, FEBRUARY 19, 1895. [47TH YEAR. PRICE 6d.

GAS AND WATER PIPES

1½ to 12 IN. BORE.

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NEW HIGH-POWER GAS-LIGHT.

INCANDESCENT GAS-LIGHT SYSTEM.

Consumes
3¾ cubic feet per hour.

Gives a light of
70 to 80 candle power.

Brilliant Light.

Perfectly Steady and Noiseless.

Smokeless.

Reduced Heat.

The Ordinary Burner, with Special Globes, is suitable for Lighting Private Houses, Public Houses, Restaurants, Shops, &c.

Special Lamps constructed for Outside Lighting and Street Lighting; and Large Clusters of Lights made for Lighting Halls and large Areas from one centre.

Can be attached to any Gas-Fittings.

THE TRIUMPH OF GAS OVER ELECTRIC LIGHT.

Taking Gas at 8s. per 1000 cubic feet and Electric Light at 8d. per Board of Trade unit, the "C" Burner will produce an equal amount of light at **One-eighth the cost of Electric Light.** This cannot be disproved.

Substantial and Pushing Sole Agents wanted in each Town using Gas.

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Near St. James's Park Station.

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THE "POSITIVE" PREPAYMENT SLOT METER.

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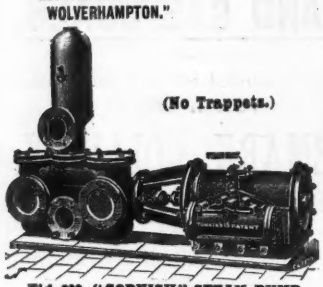

(No Trappets.)

Fig. 600. "CORNISH" STEAM-PUMP FOR WATER.

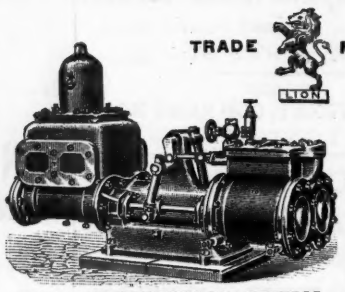

Fig. 670. DUPLEX PUMP FOR GENERAL PURPOSES.

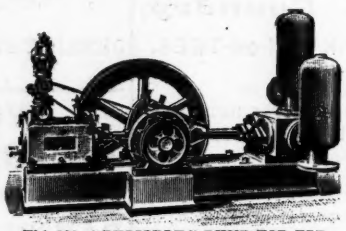

Fig. 685. "RELIABLE" PUMP FOR TAR AND THICK FLUIDS.

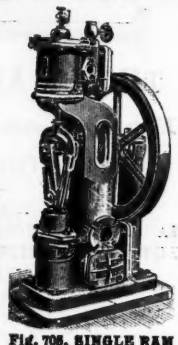

Fig. 708. SINGLE RAM PUMP FOR BOILER FEEDING, &c.

JOSEPH EVANS & SONS, Hydraulic Engineers,

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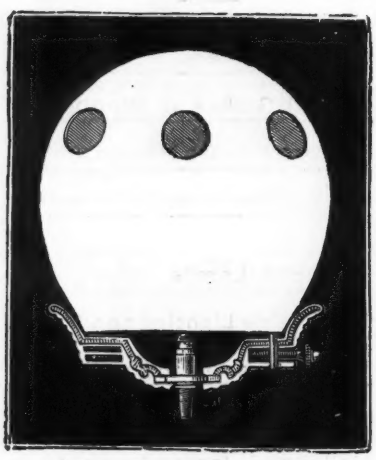

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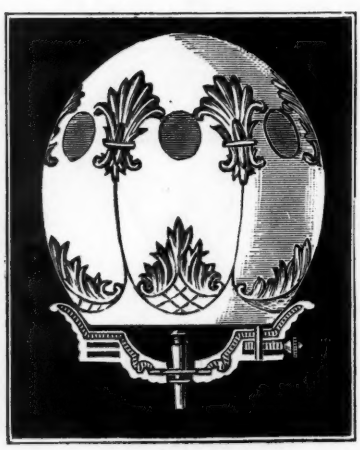

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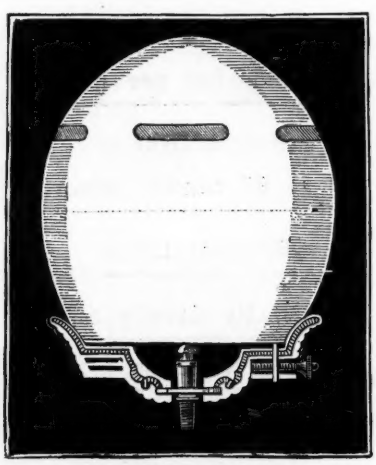

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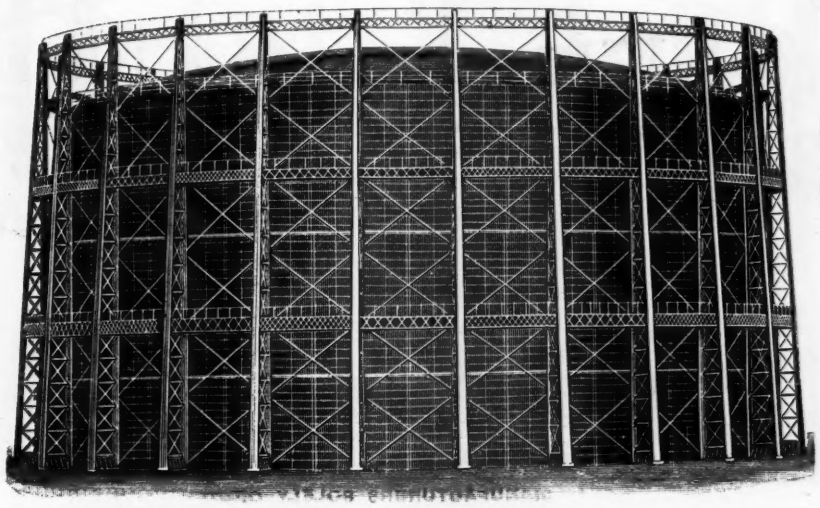

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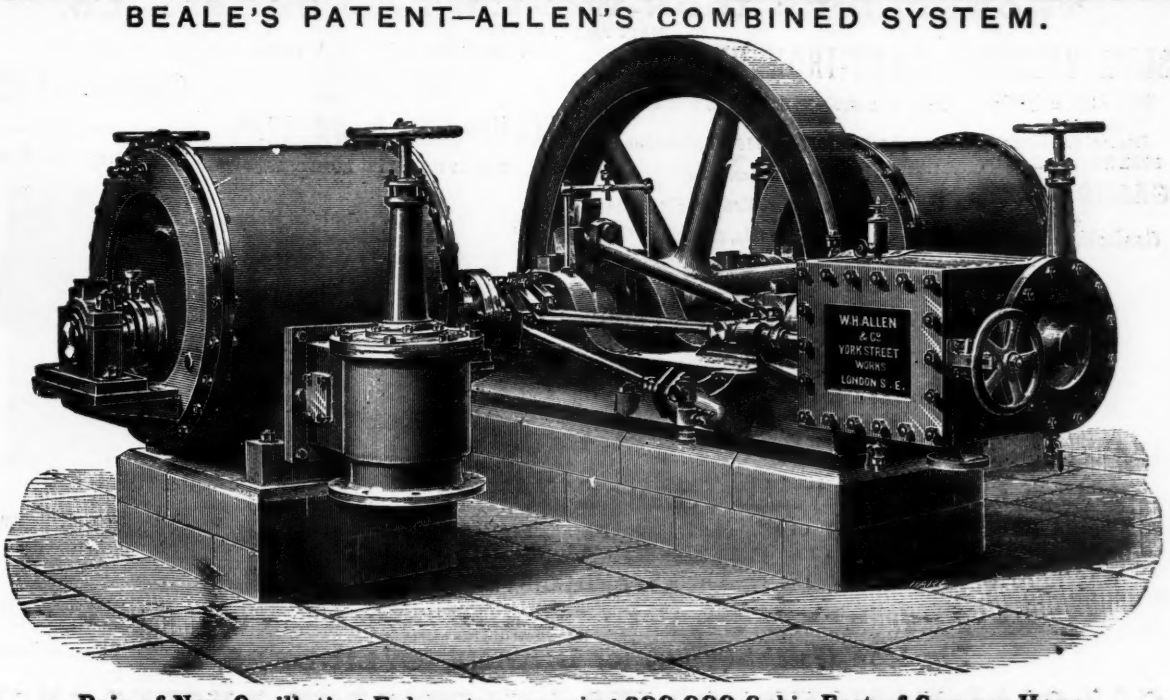

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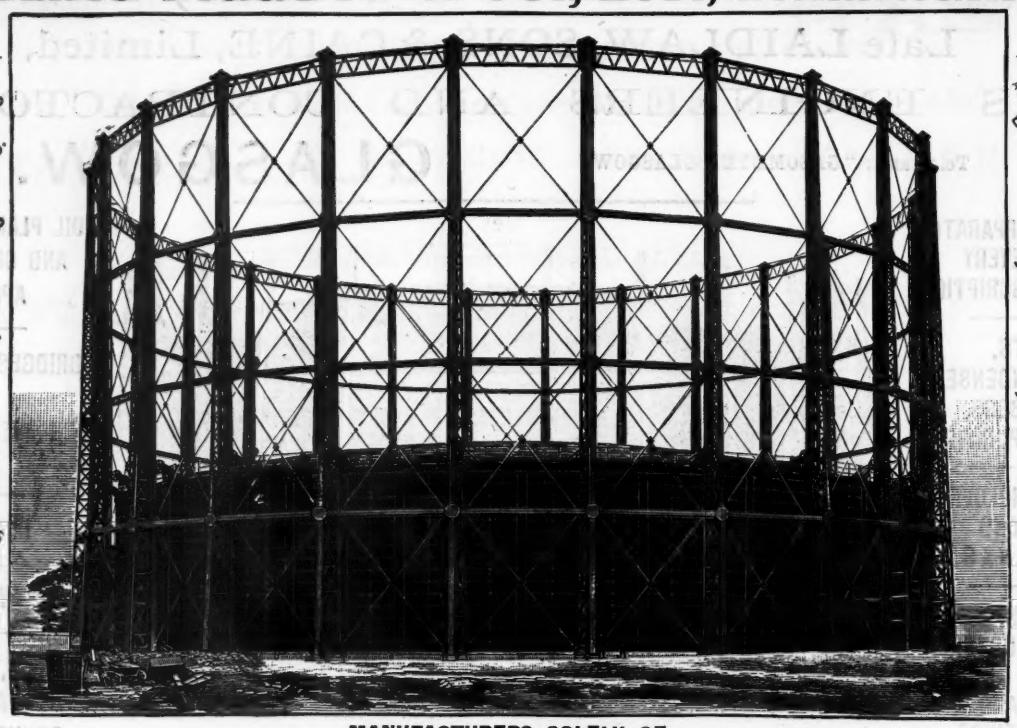

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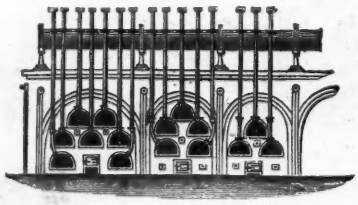

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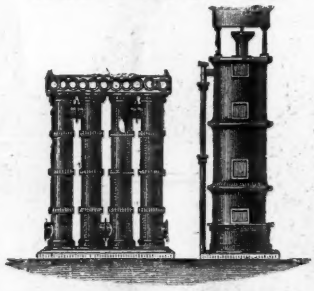

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for working Purifiers,
Also Bye-Pass & Stop Valves.

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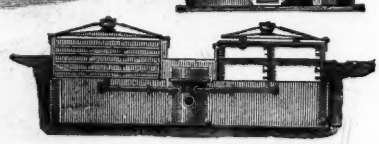

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PREVENT YOUR GASHOLDER CUPS FROM FREEZING

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It is the CHEAPEST, SIMPLEST, and MOST EFFECTIVE in the Market.

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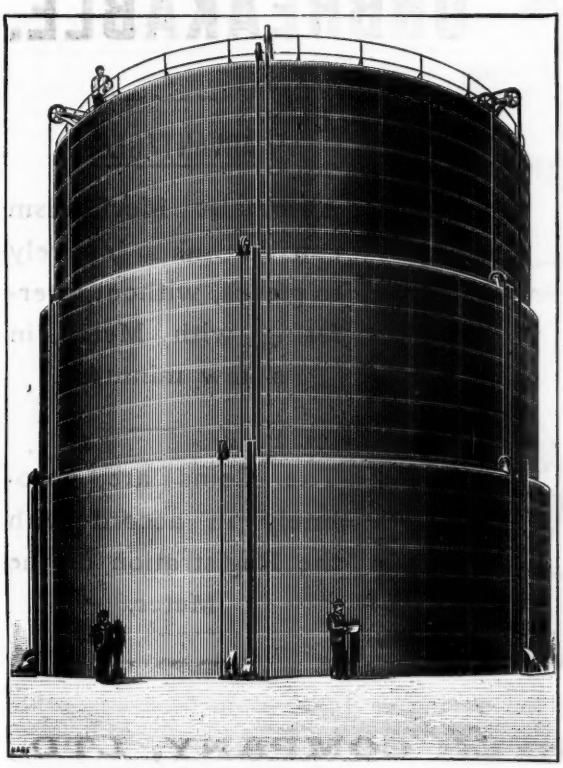

From Photo. of Three-Lift Roped Holder, 50 feet diameter by 18 feet deep each Lift. Erected at Sligo, 1894.

Pease's Patent Roped Gasholders

THESE HOLDERS HAVE WORKED SUCCESSFULLY UNDER EVERY TEST TO WHICH THEY HAVE BEEN SUBJECTED SINCE 1889.

MAY BE SEEN AT MANY PLACES.

Send for Catalogue if requiring increased Storage.

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CUBIC FEET OF GAS PER DAY.

Among the Companies supplied are The Gaslight and Coke Company, the South Metropolitan Gas Company, Birmingham Corporation, Manchester Corporation, Rochdale Corporation, Bristol Gas Company, and many other Works, both large and small, where they have been working in some instances for the past **FOUR YEARS.**

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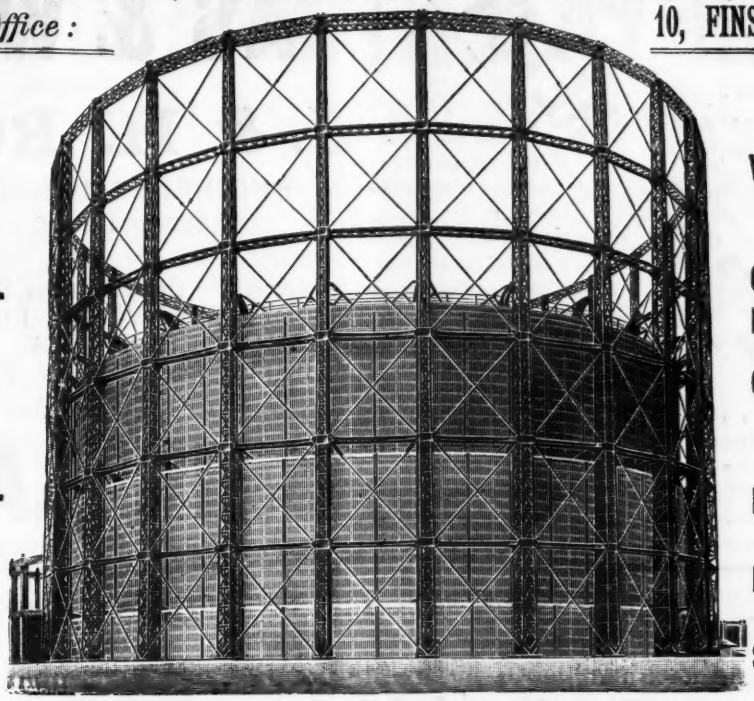

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WASHER-SCRUBBERS.

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IMPROVED STREET LIGHTING

WITHOUT ADDITIONAL COST,

With THREE to FOUR TIMES the ORDINARY LIGHT,

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THE INCANDESCENT GAS-LIGHT (Welsbach System)

The Inspector of Lighting in Glasgow reports that THE ANNUAL COST OF GAS FOR TEN INCANDESCENT GAS-LAMPS WAS £17, as against £39 with the old system, while obtaining FOUR TIMES THE AMOUNT OF LIGHT. The experiment lasted from May to November, during which time ONLY FOUR MANTLES WERE USED FOR TEN LAMPS.

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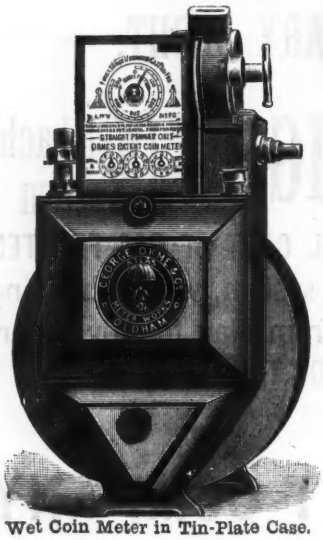

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Wet Meters in Cast-Iron and Tin-Plate Cases, and Dry Meters in Tin-Plate Cases, fitted with our

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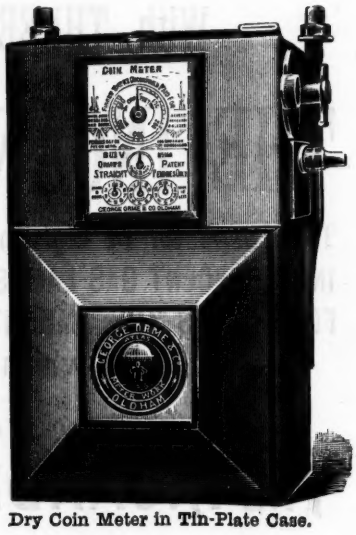

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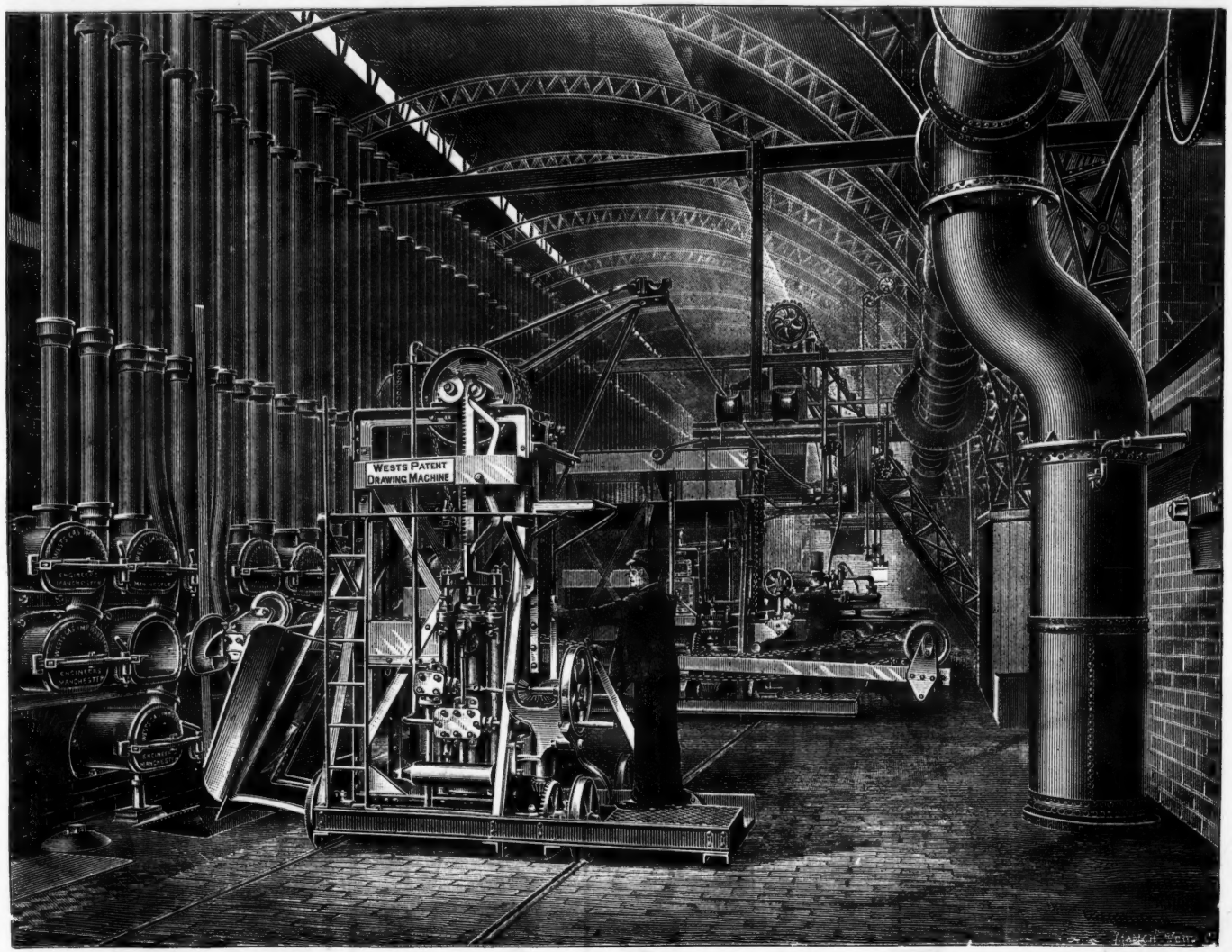

Interior of Retort-House at the Bradford Road Gas-Works, Manchester, showing the Compressed-Air Drawing and Charging Machines.

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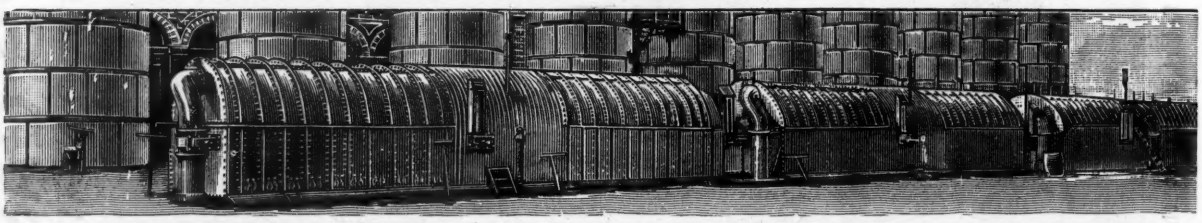
ATENT "STANDARD" WASHER-SCRUBBER

☛ **484** of these Machines (capable of dealing with **464,490,000** cubic feet of Gas daily) in use, which fact is given as evidence of this apparatus being the Most Efficient of any in the Market for the extraction of Ammonia, Carbonic Acid, and Sulphuretted Hydrogen from Coal Gas.



View of SIX PATENT "STANDARD" WASHER-SCRUBBERS, erected at the Beckton Station of The Gaslight and Coke Company (the Engines driving same being under Galvanized Iron Covers). This Company have **30** of these Machines in use. They are also in operation at a great number of Gas and other Works in this Country and Abroad.

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ALL SIZES.

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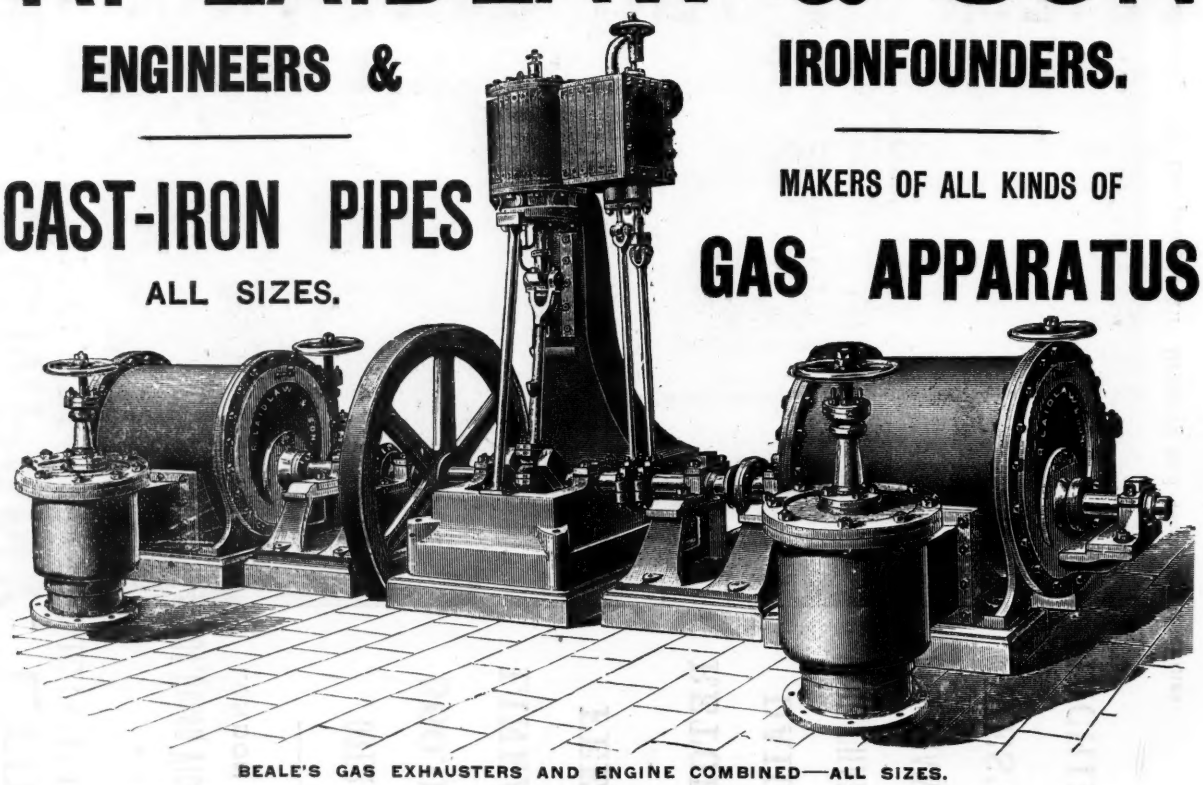

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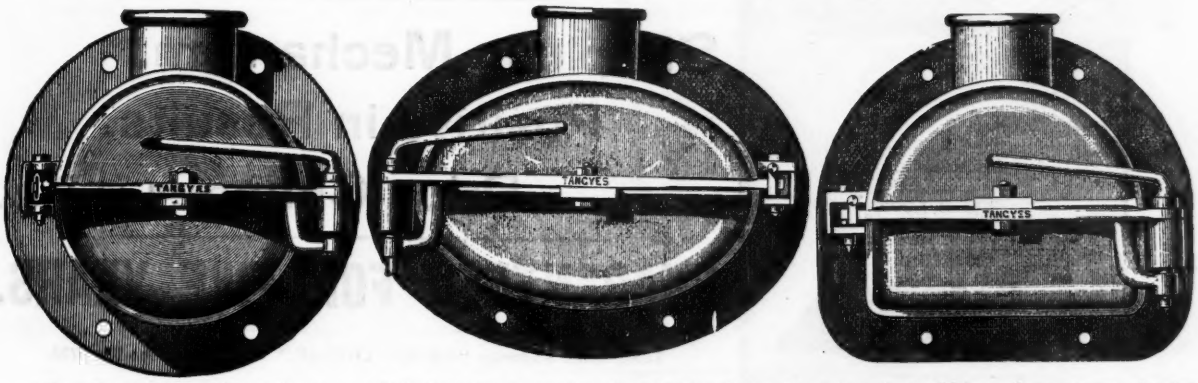

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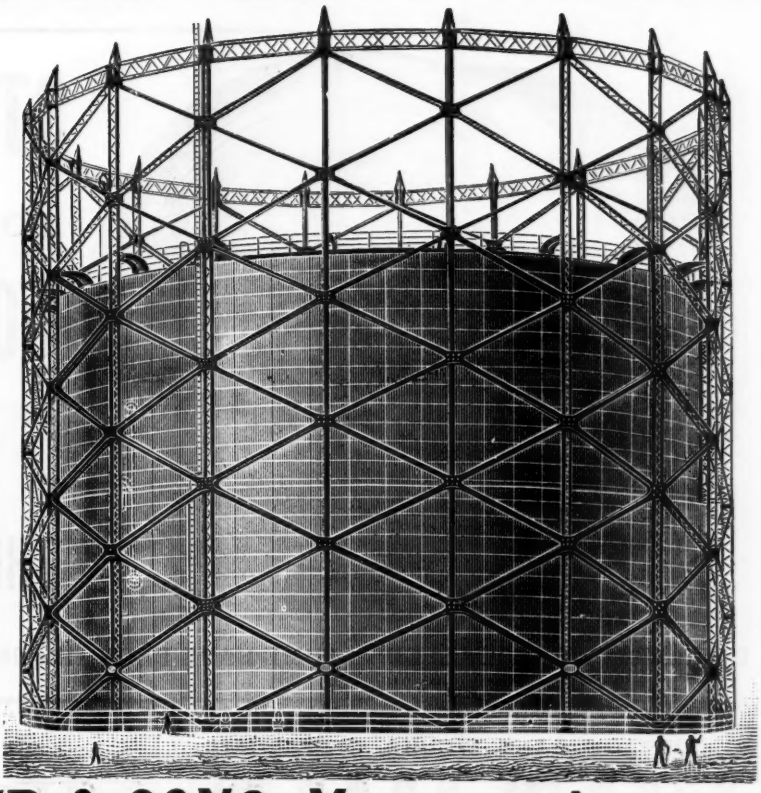

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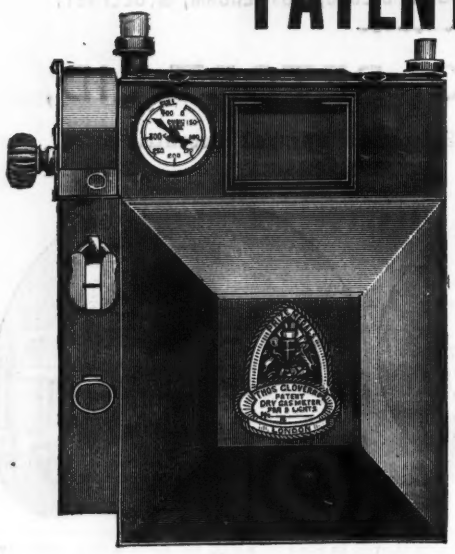

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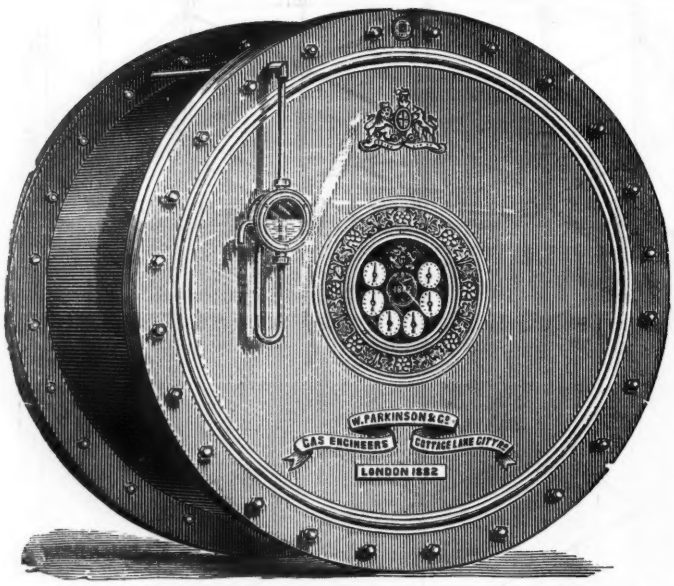

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No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a proof of good faith.

Telegraphic Address: "GASKING LONDON."
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EDITORIAL NOTES.

The South Metropolitan Meeting.

THE meeting of the South Metropolitan Gas Company on Wednesday last was of an exceptional character, as will be seen by the length of the report of the proceedings which we publish elsewhere. There were really two meetings—the first, the ordinary half-yearly general meeting, for the reception and adoption of the Directors' report and the statement of accounts of the working of the Company for the past half year; and the second, an extraordinary, or Wharncliffe, meeting, to consider the Bill which the Directors have deposited in Parliament. The attendance of stockholders was large; and many of the most influential proprietors of the different classes of stock, who are not usually seen at the general meetings of the Company, were present to hear explained the policy of the Board in regard to the Bill. The business of the ordinary meeting was soon got through. The Chairman (Mr. George Livesey) made a brief, but comprehensive, speech, touching upon the salient features of the present position of the undertaking, with some references to its past. He stated that there had been a large increase of gas consumption in the South Metropolitan district during the past year, and in the last five years; and he claimed that there has not been an increase of the capital expenditure in the same proportion. The recent remarkable augmentation in the number of consumers furnished a congenial topic to the speaker; and some striking figures were given in illustration of this branch of the subject, which was, of course, generally a vindication of the gas industry as a whole, and that section of it which is controlled by companies in particular, from the suspicion of having become effete. References were then made to the difficulties of gas making in a frost, with a river and canal borne coal supply; to the price of coke; to the Assessment Bill of the London County Council; to the diminishing cost of labour in carbonizing; and to the Southwark Bridge conduit explosion. There was no discussion of the Company's affairs; but questions were asked concerning the reserves, to which what appeared to be satisfactory replies were offered. The available cash reserves of the Company are about one-quarter of what they were before the strike of 1889; and the announcement was made that it is the intention of the Board to keep the price of gas and the dividend paid steady at the present figures until the reserve funds amount once more to something like £150,000. Of the prudence of this policy there can be no doubt.

The chief interest of the day came after the ordinary meeting had terminated in the usual manner. Mr. Livesey had a task eminently suited to his powers in explaining the provisions of the Company's Bill. He took the meeting step by step through the stages that have led the Directors to propose their scheme for converting the nominally high dividend capital of the Company into a uniform 5 per cent. stock, paying actually 6¼ per cent. citing the precedents for the proposal, and running over its advantages, which, however, needed no advocacy. It was different with the second great financial operation projected by the Bill—the commutation of the "A" and "B" stocks into what might be regarded as equivalent amounts in consolidated stock. This was, of course, a matter of internal arrangement as between the holders of the stocks; for the gross equivalent amount into which the total of both issues is convertible is a fixed quantity. It soon came out that there had been "friction" between the "A's" and the "B's" as to their respective commutation allowances. The figures given in the Bill were objected to as not being good enough for the latter; and accordingly the Chairman was prepared with an amended offer to the meeting, which he plainly declared was the last word that would be said on the subject. The "A" stockholders were willing to concede £18,000 of their original figure to the holders of the "B" stock; and the latter were told that, if they refused these terms, the Bill would go forward without the commutation scheme. We must refer to our report for details of the haggling which took place on this head. Ultimately, the counsels of the Board were taken by the meeting. The advantages of a consolidated and unified capital were seen, by all but one solitary proprietor, to be too great to be sacrificed for an internecine squabble; and there is now every probability that the assents required by the Board to justify

the preamble of their Bill will be forthcoming. The only reflection that we have to make on the subject is to question whether even a nominal 5 per cent. gas stock that actually pays 6½, and might pay 7 per cent. or more, is not too high. The ideal of a really as well as nominally low-priced stock would have been better seen in this case if the nominal rate of dividend had been put down to 4 per cent. The stockholders complain that the public do not make allowance, in the popular view of gas dividends, for the auction clauses; but there will still be a good deal of unacknowledged premium-money in the price of the new consolidated South Metropolitan stock, if the financial clauses become law in their present form.

A most interesting, although hardly, from the practical standpoint, the most businesslike portion of Wednesday's proceedings followed the disposal of the money clauses of the Bill. A decidedly regrettable article in a London evening newspaper, upon the policy of the Directors in promoting their Bill—recalling the mention in the parliamentary notice of the project to appoint workmen directors on the Board, and inciting the proprietors to attend the meeting in their own defence—was mentioned by a proprietor, and this gave Mr. Livesey an opening, for which he was probably not sorry, for bringing the whole matter before the meeting. He was in his element again, albeit the element was different, when he left the principals and interests of different orders of shareholders, to plunge into an account of how he proposed to put the crowning stone upon his edifice for housing reunited capital and labour by enabling workmen-shareholder directors to sit on the Board, and how the majority of the existing Board declined to see the necessity. This speech makes good reading; and the subsequent discussion upon it was pointed and fair. It would never have occurred to a listener at this meeting to accuse Englishmen of being bad speakers. Quite the contrary; the occasion showed that, when there is anything to say, there is certain, in any hap-hazard assembly of Englishmen, to be enough men to say it, and say it well. If this is so, then it follows that it is only in what Carlyle called "windbaggery" that our people fall behind some others, who are welcome to the credit, such as it is, for superiority in this kind of oratory. The Chairman's argument commenced with his experiences on the Labour Commission; and he made out a reasonable—though not, as it turned out, a convincing—case for his proposal. The immediate result of the discussion was that a resolution for the restoration of the dropped clause, moved and seconded from the body of the room, was allowed to be withdrawn by common consent; so that it is hardly likely we shall hear much more of the matter for the present. It is equally unlikely, however, that the man whom nearly all the gas directors and shareholders of London called a traitor twenty years ago, for his part in originating the sliding-scale, will be daunted because some directorial and stockholding minds fail to support another scheme of an equally experimental character. Every respect is due to men like Mr. John Ewart and Mr. M'Laren for refusing to act counter to their convictions in this matter, merely in deference to the Chairman. They have cleared themselves of the imputation of class jealousy in declining to associate with, or to support, a workman director merely because he is a working man. Henceforward there is no question of this nature in the matter.

The real objections to this proposal are divisible into two categories—first, the principle of special representation of a particular section of the proprietary; secondly, the difficulties of detail. We are not sure that there is much in the first objection, although it is one that directors and stockholders of the ordinary class—that is, the capitalist class pure and simple—would be likely to make a good deal of. If the proprietors of a company elect to do so, they can confer any sort of preferential right upon a particular section of shareholders; and if, up to the present time, all preferences of this character have been of a financial cast, it is because this is the only kind of responsibility that shareholders of joint-stock concerns have either realized or felt themselves called upon to realize. On the other hand, it is this very limitation of the solicitude of the ordinary shareholder to his financial interest in the business which is carried on by means of his money, that has been so strongly inveighed against by the moralists who see, in the connection that necessarily subsists between the shareholders and the employees of joint-stock companies, the same relationship that exists between every master and his man, and whose desire is that this relationship should be extricated from the screen with which the joint-stock system has hidden it from casual view. If the common shareholder is to think of nothing more than his dividends, and the common workman employed by the agents of such shareholder is to be merely a dividend-earning machine, well and good. This is, at any rate, a simple and definite way of looking at the whole industrial question, so far as corporations are concerned. A private employer has only to turn himself into a limited company, according to this convenient view, to rid himself of all moral responsibility for treating his workpeople as other than machines. Unhappily for the success of this view, however, it is one which, if it has ever held good, is no longer tenable. Experience has shown that it is unsafe, as well as unfair, to leave upon the shoulders of the official intermediaries between shareholders and their servants, all the moral responsibilities of every kind that attach to joint-stock as to individual trading. There is no man with a heart and a conscience, as well as a pocket, who would not admit that the horses of an omnibus or a tramway company ought to be represented on the Board by one of themselves, if Swift's dream were true. Then how much more the workmen of industrial corporations, who are only protected against official domination, when this becomes oppressive, by "the sacred right of insurrection," which everybody concedes it to be most undesirable to employ save as a last resource.

There are really only two sufficient answers to this latter question; and we are glad Mr. Ewart and Mr. M'Laren based their opposition to Mr. Livesey's proposal upon them. They said that the project was neither necessary nor expedient, in the present case of the South Metropolitan Company; and they undoubtedly carried with them a goodly contingent of Wednesday's gathering. Not that too much weight should be attached to this result, for circumstances were clearly against the Chairman; and in any case a shareholders' meeting is naturally averse to all policies but that of *laisser faire*. With a divided Board, what but division can be expected of the shareholders? For any good to come out of such a policy as that of Mr. Livesey, it is essential that whosoever inaugurates it should be thoroughly well supported; and, in the case in point, Mr. Livesey had best set himself to follow the Disraelian advice and convert his minority into a majority. United counsels must precede administrative success. A good deal more might be written upon this subject, which is from one point of view so large and portentous, and from another so harmless and insignificant. But our readers have enough of it for one week; and we shall therefore reserve further remarks for a future occasion.

The Board of Trade Returns.

THE Board of Trade returns relating to the authorized gas undertakings of the United Kingdom have just been issued. They are somewhat belated, inasmuch as they only bring the statistical data of the undertakings included in the Companies' return down to the close of 1893, while those of the municipalized undertakings refer to the last municipal year, which ended at Lady Day, 1894. We give in another column the principal figures of the returns; and we mention these official publications here chiefly to bring them as prominently as possible before the eyes of those of our readers who never take notice of such matters until they happen to want some specific information for themselves of the kind which the returns are well calculated to supply, when their habit is to write to us asking where anything of the kind is to be found, or even to descend to the troublesome inquiry circular. The returns are not altered in form; and now that they have indices, and the columns are filled up in almost every instance, they are a mine of information respecting the conditions of the British gas industry. The entries refer this year to 620 undertakings, of which 478 belong to Gas Companies, and 192 to Local Authorities. The total amount of capital authorized for the whole of these is £82,501,648, of which £67,655,207 is paid up or borrowed. Receipts to the amount of £18,829,305 were taken, for an expenditure on revenue account of £14,095,218. The weight of coal carbonized was 11,020,292 tons (which is not the heaviest consumption in the comparative table), from which 101,886,371,000 cubic feet of gas were sold to 2,451,585 consumers by means of 22,826 miles of mains and for the supply of 507,226 public lamps. It is worthy of notice

that, while there has been a little fluctuation in the quantity of gas consumed in the country during the past two or three years, the length of mains, the number of consumers, and the tale of public lamps lighted nightly, have all steadily grown since the returns were first collected.

A Piece of County Council Policy Checkmated.

THE great and good and noble "Progressive" majority of the present London County Council, which is not to be suspected of wishing to do anything in a furtive or unfair manner, has received a well-merited snub in the House of Commons at the instigation of Sir Henry James. The Chairmen of both the Chartered and the South Metropolitan Gas Companies have recently mentioned, and denounced, a certain Bill which the London County Council were promoting for effecting a radical alteration in the procedure whereby the Metropolis is assessed to the relief of the poor. The County Council want to make all things in and about London new; or, as it has been more bluntly put by one of their apologists in the Press, they want to make up a "legislative program" upon which to bid for votes for the present majority at the next election. Accordingly, among other things, they proposed to "form a common basis of Imperial and local taxation," to change altogether the law as to the mode of assessment for rating and taxation, to abolish the jurisdiction of the Court which has hitherto administered the law, and to create a new tribunal of an entirely different character. In order to effect these characteristically modest aims, the Council require to repeal five Public Acts of Parliament; and all this, and more, they sought to do by means of a Private Bill. Last Thursday, Sir Henry James called the Speaker's attention to the nature of the attempt in question, which was supported, in a laboured sort of way, by Mr. Stuart, who would probably hold the Council justified if the majority were to propose to regulate the sun and moon in shining upon London. But the Speaker came down upon him with the dictum that a measure proposing to affect London as a whole cannot be fairly regarded as a Local Bill. There is a remarkably French ring about the style in which the Speaker gave his opinion against the procedure adopted by the Council, which he did in the following words: "Looking to the magnitude "of the area, the magnitude and multiplicity of the "interests involved; looking to the fact that a new juris- "diction and a new Court of Record are sought to be "created in the matter of assessment, apparently doing "away with an appeal; looking to the interests involved, "to the fact of the repeal of Public Acts, which have been "themselves introduced as Public Bills; and looking to "the great interest of the Metropolis, I think full publicity "should be given to the Bill; and, in my judgment, it "would be unwise and improper to introduce it as a "Private Bill." One would think these considerations were sufficiently grave to render the Speaker's inference fair. But what does the *Daily Chronicle*—always lost in gaping admiration of the present Council's proceedings—think of the obstacles that stand in the way of their doing whatever they please, by Private Bill, with the affairs of London, and with many interests and properties? Merely that they supply "the spectacle of an energetic and public- "spirited local body contending in vain against the forest "of formulæ which House of Commons procedure raises "in its path." Clearly, it will be necessary for the "Progressive" party of the Council to inscribe "Compul- "sory reform of the procedure of the House of Commons, "and Disestablishment of the Speaker," among the other items of the "program" upon which they are trusting to be returned to power next month. The spectacle of the Chairman of the London County Council entering the House of Commons, when one of the numerous legislative projects of this body, so laudably energetic in attending to other people's business, has got into trouble, and ordering "that bauble" to be removed, is evidently within the range of probable realization.

A Trade Union "Boundary" Dispute.

ANOTHER lawsuit illustrating the ways of Trade Unionism has been heard, in the Queen's Bench Division, before Mr. Justice Kennedy and a common jury. It was a case in which two working shipwrights, members of the Shipwrights' Union, proceeded against the Chairman, Secretary, and district delegate of the Boilermakers', Iron and Steel Ship Builders' Society, to recover damages for maliciously and wilfully procuring the Glengall Iron Company to dismiss them from their employment. The contention was that the members of the latter Union arrogated to themselves the sole right of working upon iron and steel ships, to the exclusion of the shipwrights, who first organized their Union in 1824, when, of course, ships were built of wood. The shipwrights for their part claim that a ship is a ship, of whatever material it may be constructed; and that accordingly they have a continuing right to work upon it. It was thus a boundary dispute between two Trade Unions—a kind of squabble that has been heard of before, and would be heard of very much more frequently if Trade Unions were supreme in the industrial world. In the case in point, the facts were not really disputed. The district delegate of the Boilermakers' Union saw the shipwrights working in the yard, and told the foreman that, unless they were discharged, all the "iron men" would be called out. This person appears to have acted in the hectoring way which comes so natural to officials of Unions that have attained the proud eminence of being "recognized;" telling the master of a ship that his vessel should never go to sea, and generally striving to create the impression that he was a very great personage. Of course, when the case came into Court, the Chairman and Secretary of the Union went into the box and denied that the delegate had any authority to call off the men; whereupon the Judge held that they could not be legally penalized for "conspiring" with him. The jury thought the delegate had, in fact, maliciously induced the employers to discharge the plaintiffs, and not to employ them in the future; and they awarded each plaintiff £20 damages. Certain other findings were made, the effect of which was left over for argument before the Judge. But the verdict as it stands will do something to take the conceit out of certain "walking delegates;" and it is so far satisfactory.

Mr. C. R. Bellamy has been appointed Gas Examiner to the Liverpool Corporation, under the Gas Company's Act of 1865. Mr. Bellamy already fills the position of Corporation Gas Engineer; and, as the Act requires that a disinterested person shall fill the office of gas examiner, some objection was raised to this gentleman at a recent meeting of the City Council. It was understood, however, that the Company did not object; and the appointment was consequently approved.

Presentation to Mr. R. Ormiston Paterson.—A pleasant surprise awaited Mr. R. O. Paterson on his arrival at the Cheltenham Gas-Works last Thursday morning. Quite unknown to him, a testimonial had been subscribed for by the officials and employees of the Company; and this was presented to him in the presence of a large gathering, on the occasion of his completion of 25 years of service. The testimonial took the form of an address, artistically illuminated in fifteenth century style, and a solid silver epergne. The address was as follows:—

TO ROBERT ORMISTON PATERSON, ESQ., C.E.

The undersigned officials and *employés* of the Cheltenham Gaslight and Coke Company desire to offer you their sincere congratulations on your completion of twenty-five years of service with the Company. They wish further to express their unanimous feeling that, while rendering faithful and conscientious duty to your employers, you have not been unmindful of the interests and welfare of those who have been engaged under your management. The result of your labours, as indicated by the Company's works, which have been almost entirely rebuilt under your supervision, will naturally appear the most enduring memorial of your services; but the undersigned wish to take this opportunity of placing on record their appreciation of the cordial relations that have existed for a quarter of a century between yourself and subordinates. They therefore beg your acceptance of this address, with the piece of plate accompanying it, as a testimony of the mutual good-will that has continued during that period, and as an expression of their heartiest wishes for your happiness and comfort during the remaining years of your life. February 14th, 1895.

This was followed by upwards of 200 signatures; the names of those who have also been in the Company's service for 25 years being indicated by a distinguishing colour. The epergne also bore a suitable inscription. The object of the unusual gathering having been explained in a few introductory words by Mr. J. A. Coombs, the Resident Engineer, the presentation was made by Mr. John Lawson, the Outdoor Superintendent, who has been in the employ of the Company for more than 40 years. He referred to the changes that had taken place during Mr. Paterson's management, and testified to the uniform kindness and consideration he had shown to all engaged under him. Mr. Coombs followed with some remarks as to the growth of the Company's works; and Mr. J. S. Garrard (in the absence of the Cashier) bore testimony, on behalf of the staff at the central office, to the respect in which Mr. Paterson is held by all who are officially connected with him. Mr. Paterson, who was evidently touched by the kindly feeling so unexpectedly displayed towards him, having spoken a few heartfelt words in acknowledgment, the proceedings were brought to a close.

WATER AND SANITARY AFFAIRS.

THE extraordinary report from the Water Committee of the London County Council, contradicting the conclusions of the Royal Commission on the subject of the water supply, came before the Council on Tuesday last. Mr. Bassett Hopkins, the Chairman of the Committee, made a speech in defence of the report; and the further consideration of the subject was adjourned until to-day. In his remarks, Mr. Hopkins appears to have said—"the water policy of "the Council divided itself under two heads." The admission was needful; the Council having eight Bills in hand for the purchase of the existing water undertakings; whereas it is now proposed that a Bill shall be introduced in 1896, for the purpose of obtaining "the necessary "additional supplies from a purer source." The word "additional" may mean much or little; but the search "for a purer source" implies at once going outside the valley of the Thames, in order to supply London with water, more or less. The recommendations of the Royal Commissioners showed that there was no necessity for going beyond the limits of the Thames and Lea watersheds; and this was the point which their instructions especially called upon them to decide. In order to refute the conclusions of the Royal Commission, Mr. Hopkins is cavilling as to the filter-beds and storage reservoirs, and he contends that the water which comes down the Thames Valley is insufficient to augment the supply so as to meet future wants. If Mr. Hopkins requires a guarantee, he can have it—that there shall never be less than a specified quantity of water flowing over Teddington weir. Concerning the quality of the supply, if Mr. Hopkins means to prove anything adverse, he must dispose of some of the most eminent authorities in chemical and bacteriological science.

The promulgation of the scheme for a Bill to be introduced in 1896 comes at a singular juncture; the present Council being an expiring body, not sure of retaining its personal identity for another fortnight. On this ground, it would be perfectly reasonable, as proposed by Sir John Lubbock, that the subject should stand over until the new body is elected. The Bill relative to the Lambeth Company is the first which comes before the House of Commons, and was down for second reading last night; but the debate was expected to be postponed. The London Conservative members are in opposition to the Water Bills of the Council; and in accordance with the views of the Chairmen of the Companies, the principle of transfer is to be challenged by a direct negative. The struggle in Parliament will clearly be a determined one on both sides; but independently of all party considerations, it is to be hoped that the House of Commons will have a due consciousness of the broad interests which are at stake. The proposed "transfer" is simply an attack on property; and, if sanctioned, will be a prelude to further aggression. Under such a system, no investment would ever be safe, whatever parliamentary guarantees surrounded it. In its details, the water question is unfortunately but little understood. For this reason, should the Bills pass their second reading, we may hope that a Select Committee would discern their mischievous character.

One aspect of the question presents itself in a striking manner to the authorities outside the Metropolitan area. The County Council of Essex have just pronounced against the East London Water (Transfer) Bill. Their argument is that an Essex population of half a million, now rapidly increasing, is depending on local sources of water "which London ought to buy." Hence it is argued that, if there is to be a supply in bulk, it should be London supplied by an Essex authority, and not the reverse. This is a change of relations hitherto overlooked, and is not a little ingenious. Essex within the limits of the Companies intends to fight for its area, and, if the Bill passes, will seek for fair terms. A similar spirit has been manifested at a conference held by the authorities of West Kent, by whom it was resolved that, as much of the Bills as affected their localities, "should be fought "as strongly as possible."

As if to give the water question the utmost prominence, a severe and prolonged frost, worthy of another glacial epoch, has in many cases frozen up the service-pipes in the Metropolis, for which some parties desire, if possible, to hold the Water Companies responsible. If an earthquake interfered with the supply, a latent wish to hang the Water Companies would possibly still prevail in certain quarters. One gentleman in his simplicity has stated that the Metropolitan Water Companies are great gainers by a frost, as the supply is thereby restricted. In reply, Mr. Bryan, the Chief Engineer of the East London Company, has shown that, during severe frosts, the volume of water supplied invariably exceeds that which is consumed during the hottest summer weather. Taps are running night and day in time of frost; and the Companies are sternly criticized in return.

The magisterial mind seems prone to imagine that Water Companies are inclined to adopt "high-handed" proceedings; but, if the facts mentioned in the case recently heard at the Greenwich Police Court, and reported in the JOURNAL last week, are carefully scanned, but little ground will be found for Mr. Kennedy's assumption that in that instance the Kent Water Company had done anything that was harsh or unreasonable. Yet the learned Magistrate in effect fined the Company in the sum of five guineas under the denomination of costs! What are the facts? Water supplied to a house at Lewisham had been cut off, as the law allows it to be cut off, because the tenant failed to pay the water-rates. The Company, as the Secretary plainly stated, were prepared to put the water on again the moment the money was forthcoming. What, in these circumstances, is there to justify the imputation of high-handed proceedings? It is perfectly right to sympathize with the unfortunate tenant, whose impecunious condition was the cause of the action of the Company, and thereby led to a prosecution by the Lewisham Board of Works for allowing her house to be in an insanitary condition. But why should sympathy with the tenant provoke reflections on the Company? The learned Magistrate thought that "these poor people had suffered enough." Hence his refusal to make the prohibition order asked for by the Board of Works. But it is difficult to follow the logic of his Worship's ruling when he purports to vindicate the law by punishing a Water Company for a step which had the explicit sanction of the Legislature.

The enthusiasm which frequently marks the development of water-works by municipal bodies is apt to bring somewhat painful reflections in its train. To some minds, it always remains a puzzle why water-works in the hands of a company are, as a rule, managed with financial results so much better than those attained by municipal corporations into whose hands the local water supply has been committed. At Liverpool, the estimates of receipts and expenditure of the Water Committee have recently called forth considerable criticism, notably at the hands of Sir W. Forwood, who has drawn attention to the fact that the Committee began the year 1894 with a credit balance of £28,000, which stands reduced in this year's estimates to the insignificant sum of £237. "How," he asks, "has "this large surplus reached vanishing-point, and why were "the receipts valued at £8000 less for 1895 than in the "estimate of the year before?" On the other side of the account, too, there were some discouraging developments—*e.g.*, £12,000 for general repairs, as against £10,400; and £12,000 for maintenance at Rivington, as against £8600. On the total, the estimated expenditure is increased to £99,000, as compared with £85,000 in 1894—an advance of £14,000. The result, it is true, gives the Committee a large sum "to play with;" and naturally it was urged by Sir W. Forwood that, instead of their accumulating funds, the Committee should reduce the water-rate. Alderman Hughes, however, had to remind the Corporation that in August next the sinking fund would come into operation, and that this fund meant an additional obligation of some £15,000 a year. There is, and must always be, a day of reckoning in these cases. The facilities for borrowing are so great that people sometimes forget that, notwithstanding the present indulgence shown to municipal bodies, payment for borrowed money has some day to be commenced. Now, for the first time, the Water Committee at Liverpool are face to face with this necessity; and doubtless they are quite right to pursue a cautious policy, rather than the more popular programme of cutting down the water-rate to an unprofitable figure.

Mr. Edwin Lendon, whose death at the age of 81 has recently been announced from Brondesbury, was formerly one of the Directors of the Maidstone Gas Company, and was a man of exceptional business ability.

Alderman James Hatch, the "father" of the Lancaster Corporation and Ex-Mayor, died yesterday week. Deceased

(who was 77 years of age) had served on the Town Council for 28 years, and was Chairman of the Gas Committee for a long period.

Mr. Maurice Graham informs us that he has resigned the position of Engineer to the Automatic Coal-Gas Retort Company, Limited, in order to give his whole time to the new firm of Messrs. Little and Graham, Limited, contractors for horizontal and inclined retort-settings and furnaces.

Mr. Joseph Shaw, who is leaving the Huddersfield Corporation Water Department, after 21 years' service, has been presented by the members of the staff with a beautiful marble clock, as a mark of their respect and friendship. Mr. Shaw has been appointed to an office in the Darwen Corporation Water Department.

Incandescent Street Lighting at Wiesbaden.—According to the *Zeitschrift für Beleuchtungswesen*, the town of Wiesbaden is in a unique position with regard to its extensive adoption of incandescent lighting by gas. Out of 1570 street-lamps, about 760 are furnished with incandescent burners. The results have been so favourable, that a further extension of the system is now in contemplation.

Carrying Coals to Newcastle.—An analysis of Tyne imports published in the *Newcastle Chronicle* last Tuesday shows that in the past year 4891 tons of coal and coke were imported into the Tyne. There was one ton from Germany, and six tons from Belgium or Holland; as well as 2806 tons from coast ports. But 2078 tons were from Australia; and our contemporary believes this was coal for gas enrichment.

Southern District Association of Gas Engineers and Managers.—We learn from the circular issued by the Hon. Secretary and Treasurer of this Society (Mr. J. W. Helps, of Croydon), that the annual meeting will be held at the Holborn Restaurant next Thursday, when the Committee will present their report, and the President for the year—Mr. S. W. Durkin, of Southampton—will deliver his Inaugural Address. At the close of the business, the annual dinner will take place.

Incandescent Gas Lighting in Theatres.—Memel is the second town in Germany to adopt the incandescent gas-light for its theatre. At Hamburg, a theatre has been lit by it for a considerable period. The raising and lowering of the light in the auditorium during the performance is effected through a second service supplying a pilot jet attached to each burner. Five large incandescent gas arc-lamps are especially satisfactory for lighting the *foyer* and staircase at Memel. The *Zeitschrift für Beleuchtungswesen* states that the installations in the theatres of both towns have been perfectly successful.

The Managership of the West Bromwich Gas-Works.—The Gas Committee of the West Bromwich Corporation have selected Mr. Thomas Glover, the Assistant-Manager at Carlisle, to fill the position of Manager of their gas-works, in succession to Mr. W. Littlewood; and, subject to the confirmation of the appointment by the Corporation, he will commence his duties on the 31st prox. Mr. Glover's salary is to be £250 per annum, with house and firing free; and at the end of the first twelve months he will have the option of residing in a house outside the works. There were upwards of sixty applications for the appointment.

The Resignation of Mr. Hepworth.—The minutes presented by the Gas and Water Committee of the Carlisle Corporation at the meeting of the Town Council last Tuesday contained the letter addressed to them by Mr. J. Hepworth, M.Inst.C.E., resigning his appointment as Gas and Water Engineer of the Corporation (to which reference was made in the JOURNAL for the 29th ult.), and three resolutions passed by the Committee accepting the resignation, making provision for filling the vacancy, and recommending the Council to request Mr. Hepworth to act as Consulting Engineer for two years at a fixed salary inclusive of travelling expenses. Mr. Forster, in moving the confirmation of the minutes, expressed regret at losing Mr. Hepworth, spoke highly of his abilities as a gas manager, engineer, and architect; and said it would be a great service to the Corporation, and at the same time a compliment to Mr. Hepworth, if they were able to retain him under the conditions named in the minutes. The motion having been seconded, several speakers concurred in the remarks made by Mr. Forster. A member questioned the advisability of the course recommended; saying he thought the salary proposed to be given to Mr. Hepworth's successor (£500 per annum) should secure a man thoroughly capable of taking charge of the works. He therefore suggested that the resolution of the Committee, advising the retention of Mr. Hepworth as Consulting Engineer, should be deleted. Discussion then ensued upon the Committee's recommendations *seriatim*. The first was at once agreed to. On the second, an amendment was proposed that the salary should be reduced by £100; but it was rejected by 23 votes to 9. On the last, the deletion of the resolution was moved by the speaker who had suggested this course. His amendment was, however, modified so as to allow the question to stand over until the necessity arose for appointing a consulting engineer. After some discussion, a vote was taken, when the numbers were found to be equal. It then became the duty of the Mayor (Mr. G. Coulthard) to give his casting vote; and he said he had much pleasure in doing so against the amendment. The Committee's proposal was thereupon agreed to.

ESSAYS, COMMENTARIES, AND REVIEWS.

GAS AND WATER COMPANIES IN THE STOCK MARKET.

(For Stock and Share List, see p. 391.)

BUSINESS on the Stock Exchange last week was decidedly quiet; and, at first, pretty well everything inclined to be dull. The weather was not conducive to enthusiasm, being a sad hindrance to trade and traffic; and the business of the settlement interfered with enterprise in fresh transactions. Things got better, however, before the close; and prices improved materially—some of the more speculative departments showing a good rise on the balance. The course of things in the Money Market is still awaiting the influence of the forthcoming United States loan; but whether that influence will be found to have much strength remains yet to be seen. Business in the Gas Market was well up to the mark; the larger issues being especially active and firm. It may be said that an advance in the value of Gas stocks in general was effected last week; the improvements in quotations being remarkably numerous, and some of them very considerable in degree, as will be more particularly seen upon reference to the list at page 391. Gaslight "A" was extremely active, and pushed steadily up until the closing prices *ex div.* were as good as the opening prices *cum div.* Little was done in the secured issues; but nearly all rose in price. In South Metropolitans, what stock was offered was readily taken up at big figures. The "A" made a giant stride of 12¾, without business marked; and in the other two issues, there were more moderate advances. At the general meeting of the Company, there was a good deal of higgling whether the "A" or the "B" will get the most advantage out of the conversion scheme. Holders of all three classes of stock may depend upon it that the scheme will benefit them all. The conversion of their separate holdings into one big stock of nearly four-and a-half millions, in which business can be done freely, will raise their market value all round. We strongly recommend the "A" and "B" proprietors, who have not already done so, to send in their assent to the scheme without delay. Commercials rose with the rest; but there was no business in them to speak of. Suburbans and Provincials were more than ordinarily quiet, even for them; but many rose in value. Reports to hand for the last half year show that they have been doing very well, as a rule. Business was pretty brisk among the Continentals; and further advances in quotations were made. The rest presented no salient feature. The Water Companies were quiet; and there was a reactionary tendency at the close.

The daily operations were: Gas was fairly active and very firm on the opening day. Brighton advanced 3; Gaslight "A" and South Metropolitan "B," 2 each; and European, ¼. Kent Water gained 3. Business was very quiet on Tuesday. South Metropolitan "A" rose 5; and Commercial new, 2. Chelsea Water advanced 2. On Wednesday, there was a little more activity in business; but prices did not move. Thursday was very strong, though only moderately active. Large advances were made *ex div.*; and Continental Union rose 3. Business was pretty brisk on Friday; and several good improvements took place in quotations. Brentford old gained 5; ditto new, 3; Commercial old, 3; ditto new, 2; Gaslight "A" and Imperial Continental, 1 each; and British, ¼. Saturday was unusually active. Gaslight "A" was put back a point; but nothing else moved. In Water, East London receded 3; Southwark ordinary, 2½; and Grand Junction, 1½.

ELECTRIC LIGHTING MEMORANDA.

The Affairs of the St. James's and Pall Mall Company—The Accounts of Electric Lighting Companies.—The Rebuff to the Trolley-Wire System of Electrical Traction for Acton.

THE accounts of the electric lighting companies are appearing; and just now they constitute by far the most interesting portion of the contents of our electrical comtemporaries. The pattern Company—which is always held up as a brilliant example of success in this line of business, whenever the local authority of a "small and early" borough or ambitious village are to be cajoled—the St. James's and Pall Mall Electric Light Company, report an improvement from the temporary check that gave so much uneasiness to their supporters last year. From the analysis of the Company's accounts which has appeared in the *Electrical Review*, we gather that the capital invested in the undertaking has increased to £230,000; and the sales of current rose to 1,569,884 units for the year, from which a revenue of £35,829 was derived. The average price obtained per unit was 5·47d.; and the total cost of production, including a depreciation allowance, was 3·50d. per unit. The cost of the unit, exclusive of depreciation and renewal accounts, was 2·94d.; the works' cost, including coal, engine-room stores, salaries and wages, and repairs and maintenance of stations and plant, was 1·92d. per unit. Of this the coal only came to 0·76d.; so that if this is the whole expense of fuel for generating a unit of electricity in the heart of the West-end of London, where everything has to be carted a considerable distance under the most

arduous conditions, it throws a lurid light upon the prospects of the schemes one occasionally hears of for cheapening electricity for lighting purposes by utilizing the waste heat of rubbish destructors. The Company are paying 6½ per cent. per annum to the ordinary shareholders, after paying 7 per cent. on the preference shares. The works' management of this Company, which is on the low-tension system, involving generating stations close to the area of supply, or rather in the middle of it, appears to be excellent.

The Westminster Company, the next-door neighbours of the concern just mentioned, will pay the ordinary shareholders a 5 per cent. dividend for the year, and carry forward £1781. Theirs is also a first-rate district; but one has only to go as far as Kensington—not exactly an out-of-the-way region, as Londoners reckon their topographical distinctions—to get completely out of the dividend-paying electric lighting concerns. Here we find the Metropolitan representative of the House-to-House organization, the Directors of which report a steady growth of consumption, and a reduced outlay on revenue account. An improvement in the gross revenue of £1600 for the year, and a saving of more than £400 in working expenses, look at a glance like satisfactory progress towards the realization of a dividend; but one never knows what these apparent economies are really worth. And the capital account, already heavy, was increased by £6670 during the past year, chiefly for new mains, which shows that the Company have to go farther afield for their new connections. We notice that the Yorkshire branch of the House-to-House speculation, which is seated in Leeds, reports a gross profit of £3103 for the year, out of a total revenue from the supply of electricity of £6878, or very nearly one-half of the latter figure. But this is only shown by omitting to allow anything for depreciation, to which, with redemption or reserve, the Directors afterwards appropriate £1686, proposing to pay the rest as dividend. The Liverpool Electric Supply Company seem to be getting on very nicely—having enough money to pay a dividend after the rate of 6 per cent. per annum for the past half year; and the business, and especially the capital expenditure, is "still growing." The City of Bath Electric Lighting and Engineering Company also profess the utmost satisfaction with a profit of £700 for the year; and they are not overmuch discomposed at having had to spend a good deal of money on their still open capital account, some of it apparently for renewing plant. But it does not take a great deal of encouragement to render directors of an electric lighting company jubilant in the present and confident as to the future.

The electricians are striving to work up a grievance against the London County Council on account of this body having refused to sanction the proposal of the London Tramways Company for the introduction of the trolley-wire system of electric traction for working the Uxbridge Road tram-line. The local Vestry has no objection to the experiment; but the superior authority were strongly opposed to it. Accordingly the electrical traction interest has joined with the numerous bands of those who, for divers reasons, are dissatisfied with the County Council in abusing this undoubtedly arbitrary body. We do not entertain unqualified admiration of the Council; but we are free to confess that it will need more than the interested sneers of electrical speculators to make us question the wisdom of the decision to keep London thoroughfares clear of the trolley wire. Our contemporary the *Electrical Review* rashly published, in a recent issue, what it fondly imagines to be an attractive representation of the installation of the trolley-wire system in the Boulevard de Strasbourg, at Havre, as an instruction "to those enlightened members of the County Council who, in the exercise of the office to which it has pleased the ratepayers to call them," opposed the introduction of the same sort of thing at Acton. This, we are told, is a picture of "how much a desecration overhead wires really mean." The scene represented is what was originally a fine straight thoroughfare apparently at least 80 feet broad, lined with trees, and now cut up by a double line of tramrails, between which stands a row of tall standards with crosstrees of exaggerated length, so as to carry a wire exactly over the centre of each line of metals. A tramcar in the foreground is connected with one wire by means of a guy and the "trolley." All that need be said in regard to this picture is that, if Frenchmen choose to spoil their best roads in this fashion, there is no reason why English people should follow their bad example. The Uxbridge Road is not a patch for beauty upon the Havre boulevard, but it probably has ten times the traffic to accommodate; and why other vehicles should be incommoded, exposed to the risk of collision with a post every 50 yards or so, and, in the case of mail coaches and lofty vans, driven off the road altogether, for the sake of obliging the electricians, it would be difficult to show. Moreover, no fire-escape could cross a thoroughfare so wired; and, lastly, the common sense of restoring to the tramway the overhead wire which was summarily taken away from the electric lighting speculator is not very obvious. It is not to be doubted that there are thoroughfares in England which the trolley-wire system cannot spoil; and it should be relegated to these obscure quarters. If electric traction is to supersede horse traction in our more populous, to say nothing of our more sightly thoroughfares, it will have to do the best it can under the same condition that has been laid upon electric lighting, and keep its wires out of sight and out of everybody's way.

AN ARMOURY AGAINST SOCIALISM.

To those, and they are many, who occasionally find themselves at a loss for an argument, or a reason, to use against the blatancies of Collectivist propagandists, we gladly recommend the masterly work of Dr. Flint, entitled "Socialism," recently published by Messrs. Isbister and Co., Limited. We propose to give a short account of this really valuable work, as we have done in the case of several other modern contributions to the fast-accumulating stock of economic literature which it would hardly come within our province to review. The need for so bringing under our readers' notice good books that treat generally of social and economical questions has been explained in these columns on several previous occasions; and we are always ready to maintain the proposition that employers and employed should keep themselves better posted as regards all modern developments of the general ideas and principles which underlie the more overt and concrete movements of the body politic than was at one time deemed necessary. Dr. Flint's treatment of socialistic questions is particularly clear and informing; and he is a capital guide for those inquirers who, when anybody talks about Socialism, Collectivism, Land Nationalization, or any other vexed topic of the hour, experience a desire to have these names explained, to know what socialistic catch-words mean, and how they came into currency. There is nothing your agitator hates so much as being compelled to explain himself. Nine-tenths of the socialistic gibberish that Trade Union wire-pullers use to stuff the heads of their dupes withal, is mere empty talk; and nearly all the pass-words of Social Democracy are terms which are never meant to be explained. Dr. Flint is a terrible foe to this trick of vagueness, whether due to the intention of those who wish to deceive, or to the ignorance that ascribes all manner of unknown virtues to a formula. Thus his first chapter is entitled "What is Socialism?" and by the time one has read it, together with the supplementary note, he feels in a position to look calmly over the head of a man who calls himself a Socialist without knowing what he is talking about—which is the case with ninety-nine of that ilk out of every hundred.

Let it not be imagined, however, that Dr. Flint—whose book, by the way, originated in a series of lectures to working men, and is therefore written in a very homely style—teaches that Socialism should be dismissed as utter foolishness. On the contrary, he declares on his very first page that he believes there are in it good and true elements, which he wishes to see spread by the aid of discussion; just as there are, in his judgment, bad and false elements in it, which close scrutiny will not help to render more admirable. The idea, as he says, appeals specially to working men. "It is, above all, their cause that its advocates undertake to plead; and their sympathies that they seek to gain. It is on the ground that it alone satisfies the claims of justice in relation to the labouring classes that Socialists urge the acceptance of their system." Dr. Flint casts no doubt on the sincerity of those who take this view; but he observes that good intentions are not everything, and certainly do not prevent their possessors from making mistakes. It is at least arguable that Socialism might prove the reverse of a blessing to working men, although those who are pressing it on them may mean them well. All the more reason, therefore, is there for working men to try and form as correct a judgment on it as they possibly can, and to hear the case on both sides, for and against.

It is the more necessary that this should be done, because of what Socialism aims at and proposes to do. It is, as Dr. Flint shows, no system merely of amendment, improvement, reform; but a revolutionary change. "It does not propose simply to remedy defects in the existing condition of our industrial and social life. It holds that condition to be essentially wrong, radically unjust; and it therefore demands that its whole character be changed, that society organize itself on entirely different principles from those on which it has hitherto rested, and that it proceed on quite new lines and in quite another direction." Certainly, a man should think oftener than twice before he assents to any scheme so vast and sweeping, by calling himself a Socialist. Dr. Flint next proceeds to give the history of the word, and discusses the various definitions that have been given of it by different persons from time to time. This exercise leads him to the statement that Socialism, as he understands it, is "any theory of social organization which sacrifices the legitimate liberties of individuals to the will or interests of the community." He does not think it possible to get any closer to it than this, because the thing itself is of its very nature vague; and to present what is vague as definite, is to misrepresent it.

Socialism is the opposite of Individualism, which is similarly indeterminate, and made up of many degrees. Both systems are one-sided and sectarian—as most "isms" are. The truth of the social system lies between them, yet is larger than either. "The true doctrine of society must include the truth, while excluding the error, both of Individualism and Socialism;" and this is the truth that the rest of the book is devoted to expounding. To the vitally important questions whether Socialism is a merely temporary phase of historical development, or its ultimate issue—whether it is a troublesome dream that must soon pass away, or a fatal disease the germs of which the social

constitution bears in it from the first, and under which it must at last succumb, or the glorious goal to which humanity is gradually tending—Dr. Flint replies that it is not exactly any of these things. It is neither merely accidental nor purely essential. Inasmuch as truth underlies and originates it, and the exaggeration of that truth is always easy, and sometimes difficult to avoid, without being strictly necessary it is extremely natural. "Society has always the Scylla and Charybdis of Socialism and Individualism on its right hand and its left; and it is never without danger from the one or the other."

Dr. Flint tells us all about the Socialistic experiments of the past, both remote and recent. In an interesting passage which ought to arrest the attention of some of our modern fiscal reformers, he observes that "the direct and immediate cause of the ruin of the Greek cities was neither the falsity of their religion nor the prevalence of slavery. The poor had political rights and political power; and they used them against the rich to obtain equality of wealth—sometimes imposing all the taxes upon them, sometimes confiscating their goods, sometimes condemning them to death or exile, sometimes abolishing debts, and sometimes equally dividing property. The rich resisted by all means in their power—by violence and fraud, conspiracy and treason." Well may the observer remark that "fifty years' agitation of the social question in the same manner would be found sufficient to ruin the strongest nations of modern Europe;" and how true it is that ancient Hellas was more modern than the most "Progressive" of our latter-day communities! "Let Britain become, like Athens, the scene of a struggle between the rich and the poor—the former striving to keep, and the latter to seize the wealth of the nation; or let the poorer classes of Britain become like those of Rome, after they had gained their enfranchisement, weary of the production of wealth, and resolved on such a distribution of it as will give them maintenance and amusement without labour; and it will need no foreign enemy to lay this mighty empire prostrate." For the present, however, Dr. Flint is not the slightest alarmed. "The resources for good which Providence has placed in the hands of the British people are immense; and, if faithfully used, they are amply adequate to avert every danger. Although the extremes of poverty and wealth in this country be at an enormous distance from each other, the whole interval is filled up by classes which pass into one another by insensible gradations, and which collectively so outnumber either the very rich or the very poor that at present the chance of success of any socialistic resolution must be pronounced infinitesimally small. The workmen of Great Britain have never, like the citizens of Greece and Rome, sought to get free of work, but only to be better paid for their work. A feeling of the honourableness of labour is on the increase. . . . We may be less exposed to the dangers of Individualism, and more to those of Socialism, than we were twenty years ago; but to be afraid of the speedy and decisive triumph of Socialism is to be foolishly alarmed."

Dr. Flint observes that the two chief forms of Socialism are Communism and Collectivism; the latter being the only kind which is formidable, and consequently needing to be discussed. His account of the former kind of Socialism is very interesting, and shows clearly why it cannot be realized on a large scale. Collectivism he defines as "the government of all by all and for all, with private property largely or wholly abolished, landowners got rid of, capital rendered collective, industrial armies formed under the control of the State on co-operative principles, and work assigned to every individual, and its value determined for him." This is the doctrine that underlies and gives point to the oratory of John Burns, Tom Mann, Ben Tillett, and the most influential leaders of the New Trade Unionism. Their advantage in this respect consists in their possessing an ideal which is new to the populace, and, being unknown, appears to be truly magnificent.

Here it will be convenient to break off for the present; reserving for a second article further notice of how Dr. Flint meets these portentous claims.

THE GAS UNDERTAKINGS RETURNS.

THE returns relating to the gas undertakings of the United Kingdom—for the year ending Dec. 31, 1893, in the case of the Companies, and March 25, 1894, in that of the Local Authorities—were issued in the past week, pursuant to an order of the House of Commons dated the 15th of August last. These returns have lately been inquired after by many of our readers, owing to their non-appearance as usual at the close of the year in which they were ordered, or quite early in the next. Last year there was a delay of three weeks; now it has extended to seven. We give below the principal figures.

The returns furnish particulars in regard to 428 authorized gas undertakings in the hands of Companies, as compared with 429 and 422 for the years 1892 and 1891. Two of the Companies are in Scotland, and nine in Ireland. With regard to the Local Authorities, particulars in reference to their undertakings were sent by 192, as compared with 185 and 182 for the two preceding years. Of these, 35 are in Scotland, and 6 in Ireland. The total amount of capital authorized for the 620 gas undertakings is £82,501,648 10s., of which £67,655,207 10s. has been paid up and borrowed. The previous amounts were £79,890,050 10s. and £65,150,821 10s. The receipts on revenue account are £18,829,305, compared with £18,676,333; and the expenditure is £14,095,218, against £14,248,691. With regard to the working statistics, the quantity of coal and cannel carbonized in the period covered by the returns was 11,020,292 tons; the bulk of gas produced being 110,781,788,401 cubic feet, of which 101,886,371,130 cubic feet were sold. The previous totals were: Coals, 11,096,480 tons; gas made, 111,481,278,491 cubic feet; gas sold, 102,834,551,961 cubic feet. At the date of the last returns, there were 22,826½ miles of mains in use for the supply of 2,451,585 consumers and 507,226 public lamps. The previous figures were: Miles of mains, 22,674¾; consumers, 2,416,896; public lamps, 489,505. The returns are in most cases made up to the dates given above; but where other periods have been taken, the fact is indicated. As in previous returns, information is wanting in some cases in regard to the make of gas; while in others, estimates only are sent in this respect, as well as in regard to the consumption for public lighting and the length of mains. The amount of capital authorized for gas undertakings in the hands of both Companies and Local Authorities includes, in some instances, other purposes.

Comparing the foregoing figures with similar returns for the previous years, it will be seen that the capital obligations of the Companies are as follows:—

Year.	Share and Premium Capital Paid up.	Loan Capital Issued.	Capital Sold under Auction Clauses.	Premiums Realized.
1884. . .	£29,594,464	£5,330,550	£2,810,415	£1,188,750
1885. . .	30,109,429	5,404,141	3,088,460	1,306,238
1886. . .	30,960,026	5,679,830	3,209,564	1,393,773
1887. . .	31,556,788	5,839,792	3,354,093	1,473,656
1888. . .	31,736,024	6,002,510	3,488,588	1,517,902
1889. . .	32,117,202	6,090,546	3,641,730	1,563,595
1890. . .	32,884,026	6,568,676	4,008,465	1,765,557
1891. . .	34,282,164⅓	6,862,117	4,300,266	1,823,068
1892. . .	35,266,898⅓	7,149,367	4,755,597	2,144,619
1893. . .	36,491,562⅓	7,544,563	5,417,667	2,432,970

Some of the other comparative details in the Companies' returns are—

Year.	Tons of Coal Carbonized.	Cubic Feet of Gas Made.	Number of Consumers.	Public Lamps Lighted.
1884. . .	5,361,576	54,452,255,864	1,102,628	242,782
1885. . .	5,595,371	56,903,060,785	1,115,223	250,404
1886. . .	5,777,966	59,051,111,814	1,133,897	258,072
1887. . .	5,977,254	61,266,055,857	1,152,119	264,316
1888. . .	6,050,588	62,328,542,470	1,103,198	259,921
1889. . .	6,309,495	64,627,914,489	1,128,838	268,013
1890. . .	6,618,460	67,214,546,500	1,153,989	275,611
1891. . .	7,071,161	70,953,927,023	1,180,333	282,761
1892. . .	7,119,189	72,178,028,396	1,213,322	288,021
1893. . .	6,995,125	71,050,955,154	1,225,253	296,910

The somewhat similar figures for the Local Authorities are—

Year.	Amount Borrowed, including Annuities (not deducting Repayments).	Receipts.	Expenditure (exclusive of Amount in the next Column).	Interest, &c., Paid.*	Net Profit after Payment of Items in preceding Column.
1884-5 .	£18,758,895	£4,334,059	£3,066,386	£894,836	£399,714
1885-6 .	19,619,416	4,348,105	3,117,989	901,773	355,469
1886-7 .	19,723,046	4,403,262	3,127,047	951,636	359,532
1887-8 .	20,081,435	4,495,093	3,161,604	923,157	439,467
1888-9 .	21,333,833	4,817,269	3,375,197	977,154	479,489
1889-90 .	21,669,789	5,067,843	3,627,578	971,755	486,483
1890-91 .	21,891,655	5,628,212	4,231,643	956,183	460,608
1891-92 .	22,476,180	5,906,319	4,589,109	965,533	397,947
1892-93 .	22,734,556	5,983,359	4,702,179	994,517	305,040
1893-94 .	23,619,082	6,219,460	4,866,486	1,038,462	341,470

* These figures include: (1) Interest paid on loans; (2) amount paid for annuities; (3) amount of loans repaid; (4) amount paid for redemption of annuities (5) amount placed to sinking fund.

Year.	Tons of Coal Carbonized.	Cubic Feet of Gas Made.	Number of Consumers.	Public Lamps Lighted.
1884-5 . .	2,642,942	26,120,491,840	955,728	144,506
1885-6 . .	2,783,533	27,734,666,850	979,802	151,670
1886-7 . .	2,879,765	28,880,425,240	996,480	155,849
1887-8 . .	2,985,577	30,105,457,962	1,011,139	159,264
1888-9 . .	3,204,982	32,381,124,770	1,089,748	174,191
1889-90 . .	3,353,516	33,453,368,830	1,115,267	178,867
1890-91 . .	3,623,967	35,796,491,799	1,143,289	184,773
1891-92 . .	4,148,131	37,740,332,448	1,172,704	192,323
1892-93 . .	3,977,291	39,303,250,095	1,203,574	201,484
1893-94 . .	4,025,167	39,730,833,247	1,226,332	210,316

Institution of Mechanical Engineers.—We learn from the list of officers of this Institution for the present year that the President is Dr. A. B. W. Kennedy, F.R.S.; that one of the Vice-Presidents is Sir Douglas Galton, K.C.B., &c.; and that Mr. Bryan Donkin is a member of the Council.

NOTES.

The Difficulties of Snap-Shot Photometry.

In an article on the incandescent electric lamp, communicated to *L'Electricien* by M. Bainville, there occurs a passage relating to the standardizing or photometric measurement of such lamps, which may be commended to the notice of those who are inclined to favour the portable photometer as a means of determining the illuminating power of artificial lights. M. Bainville observes that in the early days of the industry, the classing of incandescent lamps was regulated by the photometric measurement. Now this is regarded merely as a check. It is admitted that photometrical measurement is, in fact, an exceedingly delicate operation; because the eye of the observer is really the measuring instrument. On the sensitiveness of this very unstable instrument, therefore, depends the accuracy of the measurement; and this sensitiveness is heightened only by practice. A person who merely makes photometric observations occasionally is generally absolutely unreliable, until he has had several days' practice. Exposure of the eyes to a strong light is sufficient to deprive an observer of all the benefit gained by long training. Lastly, the personal coefficient is of considerable importance in observations of this kind. The same measurement made by different observers may furnish results varying from one another as much as 20 per cent., and sometimes more. Various methods are used in the photometry of incandescent electric lamps; but in nearly all factories the Bunsen grease-spot photometer is used. The spectro-photometers and other varieties of the instrument which may give more accurate results in laboratories are too delicate of manipulation for industrial purposes.

Experiments with Safety Oil Lamps.

In an article descriptive of the work of the Public Control Department of the London County Council, the *Daily News* recently gave an account of the work of Mr. Alfred Spencer, the Chief Officer of the Department, in testing petroleum lamps in accordance with the request of the Parliamentary Committee which sat last year to inquire into the law relating to petroleum and the precautions that should be taken to prevent the sale of dangerous lamps. The experiments were to be made, not with the commonest kind of lamps, which are notoriously dangerous, but with specimens of the so-called "safety" lamps, of which there are many forms in the market. Mr. Spencer has constructed a model of a dwelling-room in which to practically illustrate the accidents that might occur in the ordinary use of even lamps which are regarded as safe; going so far as to provide a lay female figure at whom lamps might be thrown, as is the manner of some householders in certain circumstances. Here Mr. Spencer has carried out an immense number of experimental repetitions of the various lamp accidents that are commonly heard of in connection with fires and inquests, besides subjecting lamps to vicissitudes not within the power of the ordinary user to inflict. The results of these tests will be submitted to Parliament in due course; but meanwhile it is remarked that they tend to show that if lamp users will go to the expense of a fairly well-made lamp, with stout metal reservoir, they may even throw it about a room without necessarily causing explosion and fire.

The Effects of Wind to Leeward.

Mr. R. Irminger, a Swedish engineer, has conducted a large number of experiments upon models specially designed to illustrate the effects of wind pressure upon the leeward side of structures. His paper on the subject appeared in the *Ingenioren* of Copenhagen, and is abstracted in the "Proceedings" of the Institution of Civil Engineers. The experiments were made with the aid of a tall chimney to furnish the draught, or wind pressure; the models being kept stationary while the air acted upon them at various angles. The general result was to show that in most cases the additional strain due to exhaustion of the air on the leeward side of the obstacle presented in the path of the air current was very considerable. Taking the pressure upon a plane surface as unity, Mr. Irminger found the total resultant pressure upon a circular surface of equal cross sectional area to be 57 per cent., of which the percentage due to rarefaction on the leeward side was 72. In the case of a sphere, it was found that only that part of the surface within 35° of the diameter lying parallel to the wind's direction was subject to positive pressure; the remainder of the surface having its pressure reduced by rarefaction. In another case, a cylinder of height equal to its diameter received a pressure of 0·47 of that which would have been exerted on a plane of equal area to its cross section; the rarefaction ratio being 50 per cent. Experiments were made with models of buildings of various forms, with the general result that the effect due to rarefaction, or suction, on the leeward side was quite as important a factor as the actual wind pressure on the windward side. An example is offered of a roof of 45° pitch; the wind blowing horizontally at right angles to the ridge. Here the strain upon the lee side of the roof, tending to lift it, was more than three times the downward pressure upon the side exposed to the wind. On the windward side, the pressure was found to be greatest near the lower edge of the roof; decreasing uniformly until it became negative near the ridge. In the case of a model representing a gasholder with segmental spherical crown, the pressure on the latter was entirely *outwards;* and the resultant nearly vertical. The importance of this observation does not need emphasizing.

Experiments with the Borchers Fuel Battery.

According to the *Electrical Review*, Dr. Borchers' fuel battery, described in this column on Dec. 18 last, has since then been submitted to independent experimental tests both in England and in America. An American critic asserts that the electrical energy is not obtained from the carbonic oxide at all, but from action between the chloride of copper and the copper of the cell. This is stated to have been disproved in advance by Dr. Borchers. Mr. Robert Mond has also published results which do not agree with those of Dr. Borchers; but they also disagree with some obtained by Mr. W. Tatlow, of Dublin. Mr. Tatlow started with his cuprous chloride already oxidized to cupric chloride in the air compartment of the cell. With this alone he obtained a current with a potential of 0·2 volt; and when coal gas was led into the cuprous chloride compartment, the voltage rose to 0·36. These results are claimed to be in remarkably good agreement with those of Dr. Borchers, when due allowance is made for differences in the conditions of the experiment. It is remarked that while the practical utility of the Borchers cell has yet to be demonstrated, its principle has not been seriously damaged by the hostile criticism. It is allowed that there should be something in a discovery which has been greeted with enthusiasm in Germany, and endorsed by such authorities as Professor Ostwald. All the same, we are still far from seeing the direct production of electrical energy from fuel accepted as an industrial fact.

The Qualities of a Good Brick.

In the course of an interesting and instructive paper upon bricks and brickwork recently read by Mr. John Slater before the Architectural Association, the author described the qualities of a good brick as follows: First, regularity of shape, so that when built into a wall the pressure is equal all over its surface. Secondly, toughness, as contrasted with brittleness —*i.e.*, it ought not to snap when broken, but should require two or three hard blows. Thirdly, clearness of ring when gently struck against another brick; and not a dull, heavy thud. Fourthly, homogeneity of surface and of internal texture; and, above all, absence of small stones or pebbles and lumps of chalk. Fifthly, non-porosity, meaning slowness in absorbing water. Mr. Slater was very much disposed to think the latter quality the most important, and one that is perhaps least attended to—meaning, of course, with facing bricks. The rate at which a brick (or, for that matter, a stone) absorbs water is a more important element in its goodness than its total absorptive power, because when built into a wall the bricks are exposed only to intermittent wettings; so that the best brick is not necessarily the one that takes up least water, but the one that takes longest about it. Mr. Slater regards the crushing strength of a brick as of minor practical importance, because this strain is never approached in practice. He regards 3 tons per square foot in mortar, and 5 tons in cement, as the greatest safe loads for brickwork. Mr. Slater said that 30 per cent. of the bricks of a clamp or kiln-burning are, on an average, of inferior quality; but the natural question is: What becomes of this large proportion? One practical point upon which he laid stress was that bricks should never be selected for appearance alone; and another was to suspect batches of bricks delivered with many broken ones among them. Washing walls first with a solution of soft soap in water, about half-a-pound to a gallon, laid on with a soft brush, and followed, after drying in, with a solution of alum and water in the same proportions, was recommended as an easy way of waterproofing it. Mr. Slater prefers his joints struck as the work goes up; insisting on their being cut in at the top of the joint, and not at the bottom as the men will be sure to do if not otherwise directed.

Books Received.—"Spons' Architects' and Builders' Price Book for 1895." (London: E. and F. N. Spon.) This is the 22nd edition of this well-known work, which has been produced under the editorship of Mr. W. Young. It has for some years passed out of its original pocket-book form, as the necessity for the inclusion of new matter has arisen; but the old alphabetical arrangement is still retained, to facilitate reference, and there is moreover a good index. The contents include a chapter on electricity, with complete specifications and estimates of electric lighting installations carried out by the author.——"The *Electrician* Electrical Trades Directory and Handbook for 1895." (London: The *Electrician* Printing and Publishing Company, Limited.) This very useful Directory has now reached its thirteenth edition; and it must be acknowledged that the contents have improved with time. The book consists of three divisions—Handbook, Directorial, and Biographical—each of which has been brought up to date. It is impossible, in a brief notice, to give even an epitome of the subjects dealt with; but certainly attention must be called to two exceedingly useful features of the book. These are a large table giving full particulars of the electric supply stations throughout the kingdom; and a smaller one showing the capital invested in the supply of electricity. In discussions on electric lighting questions, the particulars here furnished will be found exceedingly useful.

COMMUNICATED ARTICLE.

THE DETECTION OF POISONOUS WATER GAS IN THE AIR, AND OF EXPLOSIVE GAS IN ELECTRIC CULVERTS.

By Frank Clowes, D.Sc. (Lond.), F.I.C.
Professor of Chemistry in University College, Nottingham.

It is probably generally known that the writer has been for several years engaged in an experimental examination of the methods of detecting inflammable gas and vapour in the air, and that he has also described an improved means of detecting and estimating such inflammable material by means of a hydrogen flame. The principal results of these investigations have been published in the Proceedings of the Royal Society,* and in the *Journal of the Society of Arts*.† Recent serious and frequently repeated explosions in the electric culverts in our streets, and of fatal poisoning by water gas, have drawn general attention to the necessity of a trustworthy means of detecting and measuring small quantities of these dangerous gases in the atmosphere. The writer has therefore been invited to place before those most concerned in preventing these accidents, the method of gas-detection which he advocates as the result of the experimental researches already referred to.

These experiments have shown that there is no means of detecting small quantities of inflammable gas or vapour in the air which equals in certainty and precision the examination of the air by means of a hydrogen flame. If this pale and hot flame is allowed to burn in air free from inflammable gas or vapour, the tip of the flame is perfectly sharp and well defined. If, however, even the most minute trace of inflammable matter is in the air, its presence is indicated by the appearance of a pale halo, or "cap," over the tip of the hydrogen flame. This cap begins to appear when only 0·1 per cent. of inflammable gas or vapour is present; and it increases in height and in density or clearness as the amount of the inflammable matter in the air becomes greater. The height and density of the cap increase with the size of the flame which produces the cap.

Accordingly, if the hydrogen flame which is used for testing is always of one standard height, it serves not only to detect, by the appearance of a cap, the presence of minute proportions of dangerous gas or vapour in the air, but further, by the measurement of the height of the cap, the proportion of this gas or vapour can also be at once ascertained. This method of detection excels in many important and essential respects the similar indications furnished by the use of other flames. It altogether supersedes the physical methods of detection by diffusion, since these are entirely untrustworthy when applied to culvert atmospheres and to leakages of water gas.

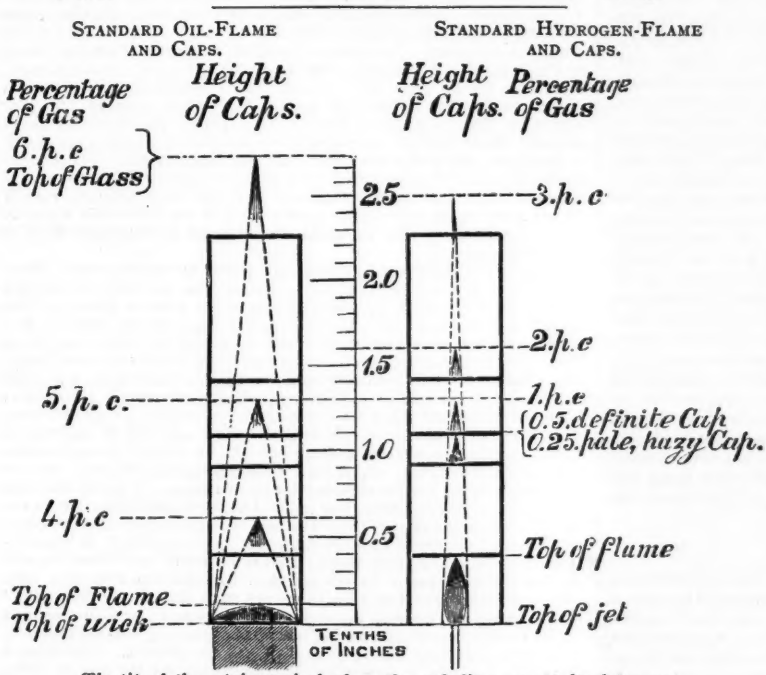
An article on the "Detection of Inflammable Gas in Electric Culverts" in the JOURNAL for Feb. 5 (p. 267) contained a description of an apparatus by which the hydrogen test may be applied to the examination of air drawn from any space into which the observer cannot enter for the purpose of making the test. This apparatus has already been applied to the examination of air drawn from the boxes of electric culverts in the Metropolis; and it has readily indicated the presence of about 1 per cent. of inflammable gas in culvert air, in which other indicators had failed to detect the existence of any inflammable material. There can be no doubt that, by means of this apparatus, samples of air can be collected and stored for examination with perfect success; that the presence in these samples of the most minute proportion of inflammable gas or vapour can be detected with certainty; and that its proportion can be measured with precision. Any space into which a flexible tube can be inserted, can be made to furnish a sample; and this may be either dealt with at once or reserved for testing at any convenient opportunity. This apparatus undoubtedly adapts itself, as no other existing apparatus does, to the examination of the electric culvert air; and there are also places in gas-works where it will be the most suitable apparatus to employ, either because the air space to be tested cannot be entered at all by the observer, or because it cannot be safely breathed even if it is accessible.

There exists, however, another form of apparatus, which was specially devised for detecting the presence of fire-damp in coal mines, and which will, under ordinary conditions, be found convenient for the detection of either coal gas or water gas in air in gas-works. This consists of one of the best and safest forms of miners' safety lamp, which serves for safely lighting in an atmosphere which may contain inflammable or explosive gas. This lamp, however, has special fittings which serve for the attachment of a small pocket cylinder charged with compressed hydrogen gas. The little cylinder can be immediately attached to the lamp, when a careful test for gas is to be made; and on opening the cylinder-valve, a standard hydrogen-flame is at once obtained in place of the oil flame. This is effected without opening the lamp. The flame of hydrogen can in turn be replaced by the lighting-flame, when this is necessary, with similar ease and safety.

Fig. 1 shows the safety-lamp with the hydrogen cylinder beside it, but not connected; fig. 2, with the cylinder connected. Fig. 3, which is partly sectional, shows the flame of hydrogen burning from the tube which passes through the oil-vessel, and shows also the scale by which the flame is set to standard height, and by which the height of the cap is measured in order to ascertain the proportion of gas present. In fig. 4 is shown a representation of the indicator-card, which is supplied for the translation of cap-height into percentage of fire-damp present. It will be seen from this, that the standard hydrogen-flame serves to measure "gas" up to 3 per cent., and that for quantities ranging from 3 to 6 per cent. the reduced oil-flame of the wick is employed.

Messrs. W. J. Fraser & Co., of Commercial Road East, the makers of this hydrogen safety-lamp, supply with the lamp full directions for its use; and they also re-charge the pocket cylinders with hydrogen when necessary. Any intelligent man, following the directions for use supplied with this hydrogen safety-lamp, could readily apply it to detect and measure minute proportions of either coal gas or water gas in the air. He would find it very advantageous to see it used at first by an

FIG. 1. FIG. 2. FIG. 3.



The tip of the cap is 0·2 inch above the scale lines, except for 6 per cent.

FIG. 4.—FLAME-CAPS AS SEEN AGAINST THE METAL SCALE.

* See Vols. L., LI., LII. † Vol. XLII. (Cantor Lectures, 1894).

experienced operator; but this is by no means indispensable. The actual heights of cap measured by the writer over the standard hydrogen-flame are as follows:—

For Coal Gas.

Percentage of Coal Gas Present in the Air.	Height of Flame-Cap in Inches over Standard Hydrogen-Flame, 0·4 Inch in Height.	Height of Flame-Cap over Flat Oil-Flame Reduced until Maximum Cap is Obtained.
0·25	0·63	—
0·5	0·74	—
1·0	1·00	—
2·0	1·62	—
3·0	2·40	0·61
4·0	—	0·80
5·0	—	1·38
6·0	—	2·60

For Water Gas.

Percentage of Water Gas Present in the Air.	Height of Flame-Cap in Inches over Standard Hydrogen-Flame, 0·4 Inch in Height.	Height of Flame-Cap over Flat Oil-Flame Reduced until Maximum Cap is Seen.
0·25	0·40	—
0·5	0·58	—
1·0	0·69	—
2·0	1·15	—
3·0	1·26	—
4·0	1·44	0·36
5·0	1·60	0·58
6·0	2·02	0·80

NOTE.—The height of the cap which can be measured in the lamp is limited by the height of the lamp-glass, the top of which is about 2·75 inches above the hydrogen jet.

It will be seen that, while it is advantageous to use both hydrogen-flame and oil-flame in testing for the whole range of percentages of coal gas, the hydrogen-flame alone serves best for tests of water gas throughout the range here given. The scale for measuring the cap-heights would most conveniently mark half inches.

It is obvious that the hydrogen testing-lamp can be carried into any atmosphere which requires to be tested for dangerous gas, and that an observation of the flame on the spot gives at once evidence of the presence or absence of gas; and if the gas is present it indicates its proportion. A judgment can therefore be at once formed as to whether or not there is any gas present, and further as to whether the proportion of gas which may be detected approaches the limit of danger.

Experiments made with this testing apparatus show that it detects easily as small a proportion as 0·2 per cent. of coal gas or of water gas; and a careful observer can find 0·1 per cent. In the case of coal gas, this proportion is far below the danger-limit. Although coal gas can ordinarily be detected by its smell, this does not serve to measure the proportion of gas present in the air. It has further been shown that coal-gas is occasionally deodorized, and is present in air without being detectible by the smell. Hence the necessity for a test such as that described.

In the case of water gas, the minimum indication of the hydrogen test is also below the limit causing rapid danger, according to the report of the Prussian Commissioners. It need hardly be stated that water gas is free from odour; and its leakage into the air cannot therefore be detected by the sense of smell. This gas is, however, vastly more dangerous, when it is breathed in the unburnt condition, than coal gas. While coal gas contains only about 12 per cent. of the poisonous carbonic oxide, water gas may contain as much as 40 per cent.; and its dangerous character is increased in proportion to the greater quantity of carbonic oxide present. For these reasons, it is impossible to employ too great precaution to prevent the escape of water gas into confined spaces, or to be too careful in testing for its presence constantly by a trustworthy indicator, since it cannot be found by any other means. No other indicator than the forms of hydrogen test referred to in this descriptive account has been proved to satisfy these conditions.

Water Softening and Scientific Filtration.—The recent issue by Messrs. E. & F. N. Spon, of a little book, bearing the above title, by Mr. W. G. Atkins, was briefly mentioned in the JOURNAL for the 29th ult. (p. 217). The author, who has had considerable experience in the erection of plant for water softening and filtration, has collected his information into the present volume, which will be found of interest to those engaged in this kind of work. We must, however, take exception to the term "scientific filtration," as we hardly think the author has given sufficient weight to the recent progress made in the United States and in this country in the perfection of sand filters for the purification of potable waters. The author's filtering-machine is an ingenious contrivance, and is made in various sizes capable of yielding from 2000 to 50,000 gallons per hour; and it should undoubtedly prove of value for the removal of suspended matter from the waste waters in several manufacturing industries. When a water requires softening, advantage may be taken of the well-known fact that precipitation and sedimentation are powerful factors in the removal not only of organic matter in suspension, but also of the micro-organisms present; so that in waters which are first subjected to a softening process, and where due allowance is made for the time necessary to ensure adequate subsidence, final filtration through a filtering-machine should be beneficial in many cases.

CORRESPONDENCE.

[*We are not responsible for the opinions expressed by correspondents.*]

The Relative Efficiencies of Acetylene and Other Artificial Illuminants.

SIR,—My respect for the intelligence and fairness of your readers will not permit me to believe that they will be drawn away from the original truth of my deductions as to the relative efficiencies of acetylene and some other artificial illuminants, by what is, I am convinced, a quite unintentional misunderstanding of my former letter to the JOURNAL by my revered friend Mr. Denny Lane; and therefore, before replying to that gentleman's accusation that I have "*rushed into a controversy overlooking some most important elements of cost.*" I would draw his attention again to my letter, when I feel sure he will frankly admit that he has not seized the point of my argument.

I most distinctly stated that "*it will be observed that I have in all cases taken Professor Lewes's figures for the cost of the energy in electrical horse power,*" as it was only by taking these figures that I could make the proper criticisms, and show the results that they lead to. I also headed my diagram as follows: "Diagram Indicating the Theoretical Efficiencies of Various Illuminants." I would respectfully remind Mr. Denny Lane that I never for a moment substantiated Professor Lewes's basis of the cost of the energy of 180 electrical horse power per twelve hours; and, if he will re-read the letter, he will also observe that I have placed my annotation mark only against the "candles per watt" for both the arc and the incandescent electric lamps, and with the petroleum oil lamp I stated the candle power for the weight of oil consumed in a similar manner. I certainly must protest against the figures which were calculated from Professor Lewes's statements being taken as guaranteed by myself.

Allow me to thank Mr. Denny Lane for calling my attention to the unwritten laws of "Cocker," and to say that the figure given by me as the cost of light from acetylene per 1000 candles was arrived at by taking calcium carbide at the rate of £4 per ton. I will apologize for having omitted to credit "the valuable bye-products." But I would earnestly advise the gas world at large to first secure their hare before disposing of the skin; for, if we are to believe the investigations of Dr. Rau, this sensational acetylene will be *thirty times as dear* as benzol. However, that there shall be no misconception, I, having no objection to the cost of electrical energy being assumed to be 4d. per unit, append a further table and diagram worked on these figures.

Now dealing with the points raised by Mr. Carlton Lambert, I must frankly say that, in my humble opinion, it would have been far wiser for that gentleman to have "let well alone;" for, according to an old-established maxim, "persons in glass houses should not throw stones." His attempts to further elucidate this subject, although doubtless made with the best of intentions for Professor Lewes, do not redound to the credit of acetylene. Mr. Carlton Lambert first attacks me for taking as the data for my calculation the figures given by Professor Lewes; and later on he says that "*in the table supplied by Mr. Wright, he assumes that* 180 × 12 *electrical horse power can be supplied for* 35s., which he states is equal to one-fifth of a penny per electrical horse power." Now, the facts, as your readers will well remember, are that it is Professor Lewes who has stated, in most definite terms, that this 180 electrical horse power required for a period of twelve hours to produce 2000 lbs. of calcium carbide cost only 50 c. per hour, or at the rate of $6 per 2000 lbs. of the "*mystic material;*" and my use of the figure is only made to show that he could do far better in the application of this small cost.

Later on Mr. Lambert is not at all averse to making use of these very figures that he has contested; and, indeed, he takes the calcium carbide at the rate of £3 10s. per ton, which price is based on the energy at $6 per 2000 lbs. But he does not neglect to multiply this charge ten times when he comes to debit the energy for the production of light direct by incandescent electric lamps. Now, it will be borne in mind that these deductions are made upon the basis of burning the acetylene neat, and not for use in enrichment, when, as Professor Lewes was bound to admit, the value did not exceed 150 candles per 5 cubic feet. This would at once reduce our available light per ton of material to 330,000 candles, as against 402,840 candles for electric incandescence with 16-candle lights, which Mr. Lambert admits himself can be obtained from the 180-horse power for twelve hours. (I would here call attention to a very palpable error in Mr. Lambert's statement that 40,284 candle-hours is the equivalent of the energy required for the production of 1 ton of the carbide, as it should correctly be 402,840.) If it is contended that the acetylene should rightly be burnt neat, then I would remind both Professor Lewes and Mr. Carlton Lambert that they have overlooked the fact that there are such things as "Sunbeam" lamps, which will develop 240 candles for 500 watts; or with energy at $6 per 180-horse power for twelve hours, a light of 805,500 candle-hours, as against acetylene giving a total of 528,000 candles. Therefore, I do rightly lay claim to having demonstrated that, for the energy alone, without the addition of the lime and coal dust, we could obtain almost double the light, and not less in the ratio of 28 : 44.

In introducing, no doubt with the best intentions, a further comparison of the expenditure of this £3 10s. in the production of light by London gas of 16-candle power at 1s. 6d. per 1000 cubic feet with Welsbach lamps, Mr. Lambert not only shows Professor Lewes and the public at large that there is no necessity for employing this "sensational" acetylene, but absolutely disregards the cost of maintenance of the mantles. My inquiries at the Incandescent Gas-Light Company's works only ten days since, elicited the information that their charge for maintenance is at the rate of 9d. per lamp per month, which, of course, is 9s. per annum, without any allowance for gas. Now, it is a well-known fact that the average amount of current utilized by electric incandescent lamps does not bring in a revenue of more than this sum to the supply companies; and my own accounts with the Westminster Electric Supply Corporation confirm this.

I do not wish to be misunderstood; and, in pointing to the fact that the charge for the supply of electricity in my own case has fallen from 8d. to 4d. per unit inside of three years, and that incandescent lamps which sold only a few years since for 5s. are to be bought to-day, with

an efficiency of 1 candle for every 2½ watts, at less than 9d. each, it behoves all good men and true to aid the gas industry by the truth, and not attempt to throw dust in the eyes of a profession who have in the past fully shown their capability of competing with this powerful rival for public appreciation.

21, *Old Queen Street, Westminster, S.W.*, FRANK WRIGHT.
Feb. 9, 1895.

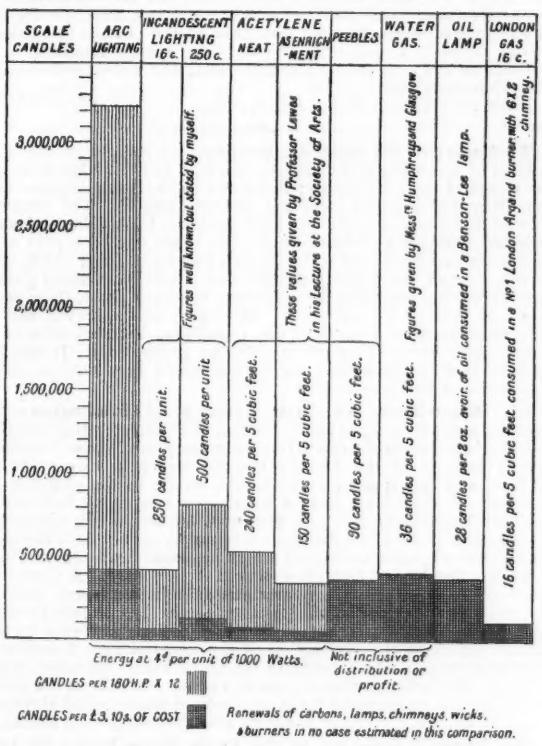
TABLE *of the Relative Theoretical Efficiencies of Various Illuminants.*

[*Note.*—Energy for the production of acetylene and other systems at 4d. per unit.]

System of Illumination Employed.	Cost.	Cost per 1000 Candles.	Candles per Ton.	Candle Power for £3 10s.	Candle Power for 180 H.P. for 12 Hours.*
		s. d.			
(1) Electric arc lamp, yielding a light of 2 candles per watt.	Energy at the rate of 4d. per unit.	0 2·00	..	420,000	3,222,000
Carbon renewals		0 ·016			
(2) Incandescent lamps, yielding 0·25 candle per watt. . .		1 4·00	..	52,500	402,840
Lamp renewals at 9d. per 16,000 candle-hours . . .		0 0·56			
(3) Incandescent lamps, yielding 0·5 candle per watt. . . .		0 8·00	..	105,000	805,680
Lamp renewals at (say) 13s.6d. per 240,000 candle-hours .		0 0·67			
(4) Acetylene gas, yielding 240 candles per 5 cubic feet. .	Cost of carbide,† £28 7s. per ton	1 0·80	528,000	65,185	
(5) Acetylene used for enrichment, and giving 150 candles per 5 cubic feet . .		1 9	330,000	40,034	
(6) Petroleum oil (Peebles) . .	3s. 4d.	0 2 00	422,400		
(7) Water gas (Belfast working)	1s. 3d.	0 2 14	..	392,000	
(8) Ordinary petroleum oil-lamp	3d. per gallon.	0 2·52	501,760	351,232	
(9) Ordinary London gas of 16-candle power, at 2s. 7d. per 1000 cubic feet	2s. 7d.	0 9·68	33,600	86,709	

* This 180 h.p. × 12 hours is the amount of energy required, according to Professor Lewes, for the production of a ton of carbide.
† This amount is based on 180-horse power for 12 hours, at 4d. per unit, and an allowance of 10s. per ton for the bye-products.

DIAGRAM *showing the Relative Efficiencies of Various Illuminants; the Energy for the Production of Carbide of Calcium and Electric Light being taken at 4d. per Unit.*


SCALE CANDLES
ARC LIGHTING
INCANDESCENT LIGHTING 16 c.
250 c.
ACETYLENE NEAT
ENRICHMENT
PEEBLES
WATER GAS
OIL LAMP
LONDON GAS 16 c.
3,000,000
2,500,000
2,000,000
1,500,000
1,000,000
500,000
250 candles per unit.
500 candles per unit.
Figures well known, but stated by myself.
240 candles per 5 cubic feet.
150 candles per 5 cubic feet.
These values given by Professor Lewes in his lecture at the Society of Arts.
90 candles per 5 cubic feet.
36 candles per 5 cubic feet.
Figures given by Messrs Humphrey and Glasgow
28 candles per 8 ozs. avoir. of oil consumed in a Benson-Lee lamp.
16 candles per 5 cubic feet consumed in a No 1 London Argand burner with 6½ chimney.
Energy at 4d per unit of 1000 Watts.
Not inclusive of distribution or profit.
CANDLES PER 180 H.P. X 12
CANDLES PER £3. 10s. OF COST
Renewals of carbons, lamps, chimneys, wicks, & burners in no case estimated in this comparison.

On the Benzolization of Coal Gas.

SIR,—I would like to call the attention of those of your readers who are interested in the use of benzol for the enrichment of coal gas to the fact that Dr. Bunte's results (*Journal für Gasbeleuchtung*, 1893, p. 442) were obtained by the benzolization of so-called "feebly luminous" coal gas, obtained by treating ordinary coal gas with fuming sulphuric acid, to absorb the so-called $C_n H_m$ hydrocarbons; and I would remind those who might have missed noticing this fact that any results obtained by crediting the whole of the luminosity of the enriched gas to the small proportion of benzol added are illusory.

I have already shown in the JOURNAL* that it is not possible to disillumine coal gas with fuming sulphuric acid, and that the gas so treated retains 40 per cent. of its original luminosity when tested in the London Argand under circumstances more favourable to the development of the luminosity of weak gases than that which was employed by Dr. Bunte.

The matter for consideration is not how much benzol is required to bring a gas that is arbitrarily described as feebly luminous, and treated as non-luminous, up to a certain illuminating power, but how much benzol is required to bring 15-candle gas up to 16 or 17 candles. In that respect it will be found that a very much larger quantity of benzol per candle will be required than is indicated either by Dr. Bunte's or Dr. Percy Frankland's experiments (*Journal of Chemical Society*, Vol. XLV., p. 191) with so-called disillumined coal gas.

1, *Victoria Street, Westminster, S.W.*, LEWIS T. WRIGHT.
Feb. 16, 1895.

* See Vol. XLIII., p. 910.

The Luminosity of Hydrocarbon Flames.

SIR,—As Mr. Thwaite has written to me privately, to say that he proposes making an answer to my article in the JOURNAL, I have thought it better to delay my reply to Mr. Young's interesting letter until your readers were placed in possession of the arguments on the other side.

The chief interest in Mr. Young's letter lies in the fact that he gives the reasons for the belief he holds. I think your readers will agree with me that I shall have done some service to the chemistry of flames if I succeed in drawing from the advocates of the "selective combustion" of hydrogen in hydrocarbons, the reason of the faith that is in them.

Owens College, Manchester, Feb. 16, 1895. HAROLD B. DIXON.

Mr. L. T. Wright's Paper at the Society of Chemical Industry.

SIR,—It is not easy to discuss a paper from an abstract of it; but there are one or two points in your abstract of the interesting paper read by Mr. L. T. Wright at the recent meeting of the London Section of the Society of Chemical Industry and the report of the discussion which followed, upon which I should like to offer a few remarks.

With regard to the enriching value of benzene, as to which Dr. Dvorkovitz appears to have been at variance with the author of the paper—mainly, as it would seem, upon the strength of results obtained by Dr. Bunte—I may say that experiments made under my direction do not confirm the latter. They show that one gallon of almost pure benzene is capable of raising only about 9500 cubic feet of coal gas by one candle; a sample of light petroleum spirit of sp. gr. ·6805 used in the same way raising only 2800 cubic feet by one candle per gallon. Dr. Dvorkovitz's objection, that Mr. Wright's experiments were made eight years ago, is hardly to the purpose, since the enriching value of benzene cannot have changed in the interval.

In calculating the illuminating power from carbon volume, the author, as was pointed out by Mr. Lacey, seems to ignore the combination of the carbon with the hydrogen—*i.e.*, the hydrogen density. If, however, this be negligible, why should benzene possess nearly four times the enriching value of the light petroleum spirit (although containing a large proportion of higher members of the paraffin series than hexane) when tested in precisely the same manner—viz., by adding small quantities of the two enriching materials to coal gas, tested, before and after the admixture, with the standard Argand burner with chimney full of flame. If the author should continue his researches in this direction, he will, I think, find that in many places his multiple of 6·65 has been considerably reduced of late years.

Having regard to my own work and connection with the development of light in Argand and other burners, commenced nearly twenty-five years ago,* it is hardly necessary for me to say that I am in perfect agreement with Mr. Wright as to the inapplicability of the "restrictions of the London Gas Referees in testing a gas experimentally in the laboratory with a 'London' Argand." In the discussion upon Messrs. Hartley and Heisch's paper, which was read at the 1884 meeting of The Gas Institute, I advocated what I conceived to be the rational method of using this burner; and I returned to the subject in my paper on "Purification," read at the 1891 meeting of the Incorporated Institution of Gas Engineers, and at greater length in the following year, in the course of my Presidential Address to the same Institution. It has been my custom for many years past, when using the 'London' Argand for experimental purposes, to fill the chimney fairly full of flame, and afterwards make the necessary correction for the consumption of gas over or under the empirical standard 5-feet rate. It certainly appears wrong, for example, to credit an enriching material with illuminating value destroyed in the first place in the coal gas, as experimented upon, by an over-supply of air to the burner.

I am not, however, able to agree with Mr. Wright that the addition of various enriching materials is an economical means of raising the heating power of coal gas, whatever may be said in their favour as a means of raising the illuminating power; and his arguments in favour of a high standard of the latter do not appear to me to be particularly convincing. If, as seems to be assumed by Mr. Wright, the question of a high or a low quality of gas is capable of being settled by a reference to current prices, why is his comparison confined to London, Liverpool, and Glasgow, to the exclusion of the rest of the kingdom, which might surely furnish examples, not only of common gas sold at lower, but also of cannel gas sold at higher, rates than those which he has quoted? Having, however, so confined it, why is the proximity of Liverpool and Glasgow to cannel-coal fields to be ignored, and likewise the fact that a very large portion of London is at the present time supplied with common gas at a much lower figure than 2d. per candle? Moreover, it must be within Mr. Wright's own recollection and experience in the manufacture of gas in London that when the premier Company were suppliers of cannel as well as common gas, the charge per candle for each kind was almost exactly the same; the common gas being, however, the cheaper of the two, on the average of the prices charged for it north and south of the Thames. Why should this have been the case if, according to Mr. Wright, a rich gas can be manufactured to better advantage than a poorer one; and why, possessing this advantage, should The Gaslight and Coke Company have deliberately abandoned it?

Mr. Wright was undoubtedly among the first, if not the first, to point out the close relationship of increase of temperature of carbonization with increased lighting value. With regard to this, however, I

* See JOURNAL, Vol. XIX., p. 440; and Vol. XX., p. 352.

may refer to an experiment of my own,* from which it may be fairly inferred that such increase of temperature is economical only within certain limits, and that beyond these limits it may be actually prejudicial to results. Also that, contrary to what might be expected, these economical limits correspond with a moderate degree of heat, although, presumably, varying with the kind of coal under treatment.

CHARLES HUNT.

Birmingham, Feb. 16, 1895.

The History of an Electric Lighting Installation.

SIR,—In an Irish town which I light with gas, the corporation and the gas company disagreed as to the price of the public lighting, with the result that the corporation gave a five years' contract for the electric lighting of some of the chief streets, and lighted the secondary streets by oil.

The electric lighting was mostly very good. Sometimes it was deficient; and sometimes it collapsed for a few minutes. In consequence, I suppose, of this, the electric company provided themselves with more extensive machinery, and did their best to get some of the private lighting. Their mode of doing business was to go to a gas consumer and say: "We will light you at the same cost as you now pay for gas." In this way they got some dozen to twenty of our consumers, professing to supply 16-candle lights. With the manager of a Scottish house, they were not so successful. He replied: "My gas account varies. You have an article to sell; I am a buyer. What will you charge per annum for each light?" With this customer they did no business. The arc lights in the streets were very good near to them, but they were placed so far apart that, midway between them, it was rather dark; and in the shops they found that they were not so well lighted as they had been before by gas.

We found that the alleged 16-candle lights were marked 10; and we told the consumers so. Disputes arose; the consumers, having been charged for putting in the electric light, were worse off than before. They still retained the gas-meter that they might turn on the gas when electricity failed; not relishing being left in darkness with customers in front of the counter. We told them: "If you retain the gas-meter, you must pay rent for it. We cannot leave our property with you for your mere convenience. But you can buy the meter if you like to." The consumers saw the justice of our plea; but they did not buy the gas-meters. They discontinued the electricity.

As the years rolled on, the public dissatisfaction increased. I knew that the same state of things had occurred in English small towns, where it would not pay to have all the expensive appliances to ensure a constant supply, such as is provided in large towns; and that the promises of electricians had not been realized in the experience of the public. Even in one English town where there was water power, the inconstancy of the electric light had led to its abandonment. Thus I was feeling the public pulse, and waiting the end of the five years' contract.

The electric company tried to get the corporation to buy them out; but this the latter refused. As a last resource, they said: "We will require a large price per lamp." If I remember aright, the contract price was £23. When things got into this state, it was in the last year of the contract. I thought it was time to move; and I put up several street gas-lamps of various illuminating powers—some of five, three, two, and one light, and told them at what rate of consumption each burned. The public took on to this. They saw how much more general the lighting would be without those very bright spots at one place and very dark ones at others which they had for nearly five years endured. A meeting of the corporation was called to consider the question of the next contract for street lighting. The public crowded to the Town Hall, and roared down the oil and the electric lighting, and demanded to have back the gas. The corporation and the gas company met again, and arranged terms for the various sized lamps. The Town Surveyor afterwards pointed out the spots where large lamps should be placed. Some of these are extinguished to one light at a late hour of the evening; but the town is now better lighted than it has been for the whole 60 years of the gas company's existence.

Several of the more important shops have also taken on these big lamps, erecting as many as half-a-dozen of them outside opposite their shops, and supplied from a separate meter. To encourage additional lighting, the gas company give all extra gas burnt at a reduced rate, as described by myself in a paper I read last year at a meeting of The Gas Institute. Thus, although we suffered by the loss of the public lighting for five years, we may in the future recoup our loss—at all events, we have got through the electric "measles," and still survive. Other corporations and other gas companies may have a touch of the disease; and my desire in writing this short history of facts, is that they may have it as mildly as possible, and escape the more virulent states of the disease. Try and never fall out with your corporation.

As a sequel, the electric light plant was taken to pieces and sold at the best price they could get; the current opinion being that the company (an English one) must have lost several thousand pounds in trying to enlighten the Irish. I have not heard that the Mayor gave them a farewell dinner, and drank *bon voyage* to them. I do not know why; for I dined with the Mayor a few months ago, and found him a very jolly fellow, with head well screwed on, and face looking straight forward.

GEORGE ANDERSON.

Westminster, Feb. 15, 1895.

Mr. Hersey and The Gaslight and Coke Company.

SIR,—Referring to the report of The Gaslight and Coke Company's meeting, in your current issue, I notice in the Chairman's speech the following reference to myself: "A Mr. Hersey, too, had written about meter-rents, stating that the charge was illegal, and that he would not pay it. They first tried the '*suaviter in modo*' with this gentleman; and he declined to pay. They then tried the '*fortiter in re*,' and sent him a county court summons; and he paid on the previous day." Now, the foregoing statement may be very humorous, and doubtless served the desired purpose; but unfortunately it is not strictly accurate—the Chairman having confused my actions with those of my Company. With your permission, I will therefore occupy a portion of your space to rectify the error.

As regards myself. My communications to the Press were confined to indicating the discrepancy between the meter-rentals charged by the Metropolitan Companies and the basis for same authorized by the Act of 1860, and to suggesting that, if the charges made were illegal, they should be revised accordingly, and the overcharges recovered. I did not therefore state that the charges were illegal, but left this point to be decided by the "inquiry," which I am sufficiently sanguine to believe will take place, notwithstanding the Chairman's complimentary allusions to Mr. Bryce. In this event, there will assuredly be no dearth of grievances to be submitted for consideration.

The question of meter-rentals does not personally affect me, as my meter is supplied free of charge. Consequently, the want of accuracy in the Chairman's statement is evident. But my objects in writing to the Press were twofold: (1) To secure a revision of the rates; and (2) to afford an additional reason for the "inquiry" demanded—the latter, in order that my Company's grievance (common to all dealers in gas appliances) should be redressed. As to the effect these communications may have produced, I can only say that, whilst repudiating any credit to myself in the matter, nothing could be more satisfactory than the course events are taking with respect to both of the objects mentioned.

With regard to my Company (Hersey Bros., Limited), and its action respecting the meter-rental charged by The Gaslight and Coke Company, as Managing-Director, I beg leave to slightly qualify the Chairman's statement alluded to. The refusal to pay was (like the decision as to the abolition of meter-rentals of The Gaslight and Coke Company six months ago) qualified by a condition—viz., that the charge must be proved to be legally correct. But (unlike The Gaslight and Coke Company's case, where the decision was reversed without the stated condition being fulfilled), in my Company's case the question of legality was sufficiently established by the advice taken to render a "test case" unadvisable, especially in view of the charge being entirely removed.

I say "*sufficiently* established" advisedly, as the single element of uncertainty lies in the question of exemption, or otherwise, of the meter contracts under the Stamp Act. This point also waits the "inquiry" for decision; and, consequently, the question of re-fund.

In conclusion, I would point out that the Chairman's description of my Company's case tends to demonstrate the prompt manner in which his Company disposed of the matter. But that this was scarcely the case will be seen when I explain that two months elapsed between the "*suaviter in modo*" and the "*fortiter in re*" episodes, although the date of the former was coincident with that of the definite (conditional) refusal to pay. Considering, therefore, the special remedies at the disposal of gas companies in such cases, the delay mentioned is somewhat significant.

GEO. W. HERSEY.

Belsize Park Gardens, N.W., Feb. 14, 1895.

Winding-up of the Selby Gas Company.—A meeting of the shareholders of the Selby Gas Company was held last Tuesday, to receive the report of the Liquidators; the works having been disposed of to the Selby Local Board (now the District Council). The document showed that the gas-works had been sold, the book debts and assets collected, and that a dividend of £50 per share had been paid to the shareholders. There was still in hand a balance of £225, which, when certain charges yet to pay had been met, would leave about £122 in hand; and after providing for a dividend of 4s. per share, there would be a final balance of £42 9s. 1d. The report was approved, and the balance ordered to be paid to the Liquidators in recognition of the extra labour involved by the winding-up proceedings. It was also resolved that the books and documents should be destroyed on the dissolution of the Company.

The Water-Works Purchase Question at Bridlington.—This question is arousing more public interest at Bridlington than anything that has been before the ratepayers for many years. Last Tuesday, a special meeting of the District Council was held to consider the subject; and the space allowed to the public in the chamber was crowded. A deputation from a meeting of ratepayers held on the previous Friday attended, and presented the resolutions which were then passed, to the effect that the water supply should be in the hands of the Council, and that the Bill which has been deposited in Parliament by the Water Company should be opposed. A Committee appointed to investigate the matter also submitted a report; and they recommended that notice of opposition to the Bill should be given, and that a direct appeal should be made to the ratepayers for their opinion regarding the acquisition of the undertaking. Considerable discussion ensued, which ended in the Clerk being instructed to give notice to the Parliamentary Agents to oppose the Bill, on the ground that there was no necessity for it, as £3000 of share capital remains to be called up, and no further statutory powers are at present needed.

The Proposed Purchase of the Fylde Water-Works by Local Authorities.—The Directors of the Fylde Water Company recently met, at their Kirkham offices, a deputation representing the various authorities within their area of supply, the matter to be discussed having reference to the proposed purchase by the latter of the Company's undertaking. Mr. T. Loftos, the Town Clerk of Blackpool, said the principle of the water-works being owned by a Joint Board composed of the different authorities in the area of supply, had met with the unanimous approval of them all; and the deputation came before the Directors to ask if they would enter into friendly negotiation so as to effect a sale. Mr. E. Birley, the Chairman of the Company, said the Directors were not desirous to sell, either on their own behalf or on that of the shareholders. If, however, the authorities were willing to come to terms, so that the concern could be handed over to a Joint Board, the Directors would give every facility for its transfer. A vote of thanks to the Directors, for the friendly spirit shown, was passed; and the proceedings closed. The next step in the negotiations will be the submission of a price for the property by the authorities. The districts included in the area of supply are Blackpool, Fleetwood, Kirkham, Lytham, St. Anne's-on-the-Sea, Garstang, and the townships covered by the Fylde Rural District Council.

* See Minutes of Proceedings of the Institution of Civil Engineers, Vol. CXVII., p. 212.

PARLIAMENTARY INTELLIGENCE.

HOUSE OF LORDS.

The following progress was made with Bills last week:—

Bills read the first time: Ambleside Local Board Gas and Water Bill,* Barnsley Corporation Water Bill,* Chesterfield Gas and Water Board Bill,* Dewsbury and Heckmondwike Water Bill,* Edinburgh and District Water Bill,* Hebden Bridge and Mytholmroyd Gas Board Bill,* Hebden Bridge Local Board Gas Bill, Merthyr Tydfil Local Board Water Bill,* Rotherham Corporation Bill.

The Bills marked * were subsequently read a second time.

Bills read the first time and referred to the Examiners: Bristol Water Bill, Felixstowe and Walton Water Bill, Ilfracombe Gas Bill.

Standing Orders complied with: Bristol Water Bill, Felixstowe and Walton Water Bill.

HOUSE OF COMMONS.

Friday, Feb. 15.

WATER SUPPLY AT WINCHESTER BARRACKS.

Mr. WICKHAM asked the Secretary of State for War whether he was aware that, at the recent conflagration at Winchester Barracks, there was no adequate supply of water, and also that no fire-buckets were available; and, if so, whether measures had been taken against any such want of common precaution in case of fires breaking out in other buildings under the charge of the War Office.

Mr. WOODALL said there was no failure in the supply of water during the fire referred to, though a certain time did elapse before full pressure could be obtained. There were 120 fire-buckets in the barracks; but the spread of the fire was so rapid that they were of little use, and all efforts had to be directed to working the fire-engines and saving property. The woodwork appeared to have been very dry; and the strong wind blowing at the time of the fire rendered hopeless the efforts of the men to save the building. Instructions for dealing with fires and for drill with fire apparatus were published in the regulations; and there did not appear to have been any want of precaution in the present case.

The following progress was made with Bills last week:—

Bills brought in and read the first time: Aberdeen Harbour Bill,* Bridlington and Quay Water Bill, Brighouse Corporation Bill,* British Gaslight Bill, Brymbo Water Bill, Chelsea Water Bill, Chelsea Water (Transfer) Bill,* Clonmel Corporation Bill,* Cranbrook District Water Bill,* Croydon Corporation Bill,* Dublin Corporation Bill,* East London Water (Transfer) Bill,* Grand Junction Water (Transfer) Bill,* Hayward's Heath Gas Bill, Kent Water (Transfer) Bill,* Lambeth Water Bill, Lambeth Water (Transfer) Bill,* Newmarket Gas Bill, New River Water (Transfer) Bill,* North Middlesex Gas Bill, Scarborough Gas Bill, South Metropolitan Gas Bill, Southwark and Vauxhall Water (Transfer) Bill,* West Middlesex Water (Transfer) Bill,* Whitby Water Bill, York New Water Bill.

Of the above-named Bills, those marked * were ordered for second reading; the remainder being referred to the Examiners.

A petition has been presented against the Clonmel Corporation Bill by the British Gaslight Company.

Sir John Lubbock has put upon the paper a notice of motion in the following terms in respect of each of the Water-Works (Transfer) Bills of the London County Council: "That the further consideration of all Bills for the acquisition of the property of the London Water Companies be postponed until the County Council shortly to be elected shall have had an opportunity of pronouncing upon the subject." As the Lambeth Water (Transfer) Bill stands first for second reading, the question will be debated on that Bill.

A Select Committee—consisting of Sir John Barran, Mr. Burt, Mr. Crombie, Mr. C. Fenwick, Mr. Alban Gibbs, Mr. Godson, Sir Edward Hill, Mr. Justin M'Carthy, Sir Samuel Montagu, Mr. Jasper More, Sir Albert Rollit, Sir Henry Roscoe, Mr. J. Stevenson, Mr. Stewart Wallace, Mr. Webster, Mr. Whiteley, and Mr. Wrightson—has been appointed, to inquire whether any and what change in the present system of weights and measures should be adopted.

The following notice of a question by Mr. J. Rowlands stood on the paper for last night: "To ask the President of the Board of Trade whether he is aware that the Water Companies, who are empowered to make their charge for supplying water to the consumers in their houses, are at present failing in many cases to carry out their contract; whether he has any power to compel the Companies to supply water direct to the consumers' houses, and, if so, will exercise his authority, which would cause the Companies to engage a number of the unemployed to carry a supply to the householders who have to pay the water-rate."

LEGAL INTELLIGENCE.

The Alliance and Dublin Consumers' Gas Company v. The Dublin Corporation.

In the Queen's Bench Division of the High Court of Justice, Ireland, last Saturday week, an application was made by the Dublin Corporation, before Justices O'Brien, Holmes, Gibson, and Madden, for a new trial of the action which was heard by Mr. Justice Andrews during the last sittings,* and which resulted in a verdict for the plaintiffs for £275 18s. 2d., in addition to £35 11s. 7d. lodged in Court. The new trial notice asked that "the verdict may be reduced from £275 18s. 2d. to the sum of £35 11s. 7d. over and above the sum lodged in Court (said sum of £35 11s. 7d. being the total of the items claimed in this action in respect of supplying gas to public lamps in the city of Dublin beyond the distance of 50 yards from the mains of plaintiffs), upon the ground of misdirection and nondirection of the learned Judge, and on the ground that the residue of said sum of £275 18s. 2d. was claimed in respect of supplying gas to public lamps in the city of Dublin within the distance of 50 yards from the mains of the plaintiffs, and which the defendants as the local authority required to be supplied, and on the ground that the work, labour, materials, and money in respect of which the said residue is claimed, are included in the supplying of gas, and that the obligation of the plaintiffs to supply gas under section 24 includes the obligation to supply such work, labour, materials, and money, and that the payment for same is included in the price agreed to be paid, and paid by the defendants to the plaintiffs for gas supplied during the period covering the claim. And take further notice the defendants are willing that a final judgment be now marked for the plaintiffs for the said sum of £35 11s. 7d. over and above the sum lodged in Court." Mr. R. P. Carton, Q.C., opened the motion for the defendants. Mr. J. Gordon, Q.C., and Mr. A. F. Blood were heard for the plaintiffs. The Solicitor-General for the defendants replied, and judgment was reserved.

* See JOURNAL, Vol. LXIV., p. 1169.

Surreptitious Consumption of Gas at Cardiff.

At the Cardiff Police Court yesterday week, Samuel May was summoned for fraudulently abstracting gas from pipes belonging to the Cardiff Gas Company. Mr. Spencer, who appeared for the prosecutors, stated that the previous tenant of the house now occupied by defendant had been supplied with gas; but, upon May taking possession, the meter, was removed, and the service-pipe was capped by the Company. Defendant had been a previous consumer of gas; but on the nights of Jan. 29, 30, and 31 and Feb. 1, he was using gas without a meter, by making a connection with the service-pipe. Mr. Lewis Morgan, for the defence, pleaded guilty. The Stipendiary said this was a gross and disgraceful fraud. Such acts inflicted great pecuniary damage on the shareholders of the Company; and this was a case which might have constituted an action for larceny. Defendant would be fined £4 and costs, or, in default of distress, be imprisoned for one month, with hard labour.

Discount on Gas Accounts at Longton.—The Gas Committee of the Longton Town Council have agreed that, from March 31 next, a discount of 5 per cent. shall be allowed on all current gas accounts which are paid within one calendar month from the date of delivery of the demand note. When the minutes recording this resolution came before the Council for approval, Mr. J. Johnson raised some objection to the proposed discount. He thought, if it was confirmed, it would take from the gas profits £570 per year. When the price of gas was reduced from 3s. 6d. to 3s. per 1000 cubic feet, there was a loss of £1126 to the gas-works; and when the meter-rent was reduced, it took £690 from the undertaking. It had left them in this position—that the gross profits of the gas-works only returned now 7 per cent.; and when interest and repayments were met, it left a profit of merely 2 per cent. They had £120,000, or nearly so, as risk; and he considered the profits ought to go in reduction of the rates, and should not be looked at from the consumers' standpoint. Alderman Aynsley, on the contrary, was of opinion that the consumers should be studied, and fair consideration be shown to them. The gas-works were paying their way, and liquidating their liability. The minutes were confirmed.

Beyrout Water Company, Limited.—The ordinary general meeting of this Company was held last Tuesday, at the London Offices, No. 17, King's Arms Yard, E.C. Mr. Edward Easton presided, and moved the adoption of the report, to which, he said, there was nothing of importance to add. The gross revenue for the year ending Sept. 30 last amounted to £13,808, as against £12,834 for the preceding year, which was an increase of £974. After making proper allowances for proportion of cost of new machinery and depreciated value of plant, and carrying £1000 to reserve for contingencies, a net balance of £7762 remained. During the year interest has been paid on the ordinary debentures at the rate of 4 per cent., which would be continued in the current year. Two of the Directors (Messrs. Morris and Western) had recently visited Beyrout, and made a careful examination of the works. They also had an opportunity of opening negotiations with the Municipality, which, it was confidently believed, would lead to a prolongation of the concession; but it was premature as yet to enter into any details. These, however, would be communicated to the shareholders as soon as anything was definitely settled. Mr. J. Morris seconded the motion, which was carried. The retiring Directors (Messrs. Easton and Morris) and the Auditors were afterwards re-elected.

The Kentish Opposition to the London Water Bills.—At the meeting of the Erith District Council last Friday, the Chairman (Mr. C. Streeten) said he had recently attended a conference of representatives of various local authorities whose districts are likely to be affected by the Water-Works Transfer Bills of the London County Council. He explained that he did so on behalf of the Erith Council, as he considered that the Kentish authorities ought to oppose the London Council's scheme. The Clerk (Mr. F. Parish) read a copy of the minutes of the conference, which contained the following resolution: "That the conference are of opinion that the Bills should be opposed by all the Kent authorities interested, unless provisions are inserted in the Bills, or arrangements made, for securing to the Councils and authorities outside the County of London, independent control over the sources of supply, and so much of the undertakings and works as may be required for the efficient supply of the outside districts." It was also decided to take the necessary steps to secure united action, and divide the expense. Continuing, the Chairman said he thought it would be a wise step to commence opposition; and therefore he would move that the Council support the action of the conference. Mr. Schofield moved an amendment in opposition to this proposal; contending that the Council would not gain anything by their action. In this he was supported by Mr. Dane, who asserted that the London Council would be more considerate than the Kent Water Company. In the end the amendment was lost by six votes to three; and the motion was thereupon put, and carried.

MISCELLANEOUS NEWS.

SOUTH METROPOLITAN GAS COMPANY.

The Ordinary Half-Yearly General Meeting of this Company was held at the Bridge House Hotel, London Bridge, last Wednesday—Mr. GEORGE LIVESEY in the chair.

The SECRETARY (Mr. Frank Bush) having read the notice convening the meeting, the report of the Directors (with the accounts for the six months ending Dec. 31 last, given in the JOURNAL for the 5th inst.) was taken as read.

The CHAIRMAN said he intended to go as briefly as possible through the report, as they had a great deal of very important business to transact later on. He thought they would consider the statement in the first paragraph—that there had been an increase of over 7 per cent. in the consumption of gas—as satisfactory. The increase was no mere "flash in the pan;" for he found that, as compared with the December half of 1889, the increase in the quantity of gas sold by them in the past half year had been at the rate of 21 per cent. Although, therefore, the increase in the six months under review was rather in excess, there had been a very fair increase in the last five years; and he might also state that their capital had not increased in the same proportion as their business. The next paragraph dealt with the automatic meters; and this, he thought, was also a very satisfactory point. The report told them that they had 25,516 of these meters—that was to the end of last year; but the number was now more. The Directors had adopted the plan of setting out in the revenue account the exact number of these and the ordinary meters which the Company had in use half year by half year. Therefore, if the proprietors kept their reports, they would be able to see how the business progressed. They stated that they had now 113,000 meters in use, of which 25,516 were on the automatic system. Perhaps it would make this matter clear, and express more forcibly the nature of this increase of business, if he stated that the United Company—the Phœnix Company having started in 1816—had been in existence nearly 80 years; and prior to the introduction of automatic meters, they had about 80,000 consumers. They might therefore say that for each year they had been in existence they got 1000 consumers. In the last two years, however, they had added over 20,000 to the number, which he thought might be taken as very good evidence that gas was not "played out" yet, although it seemed to have been played out in that room [in which the electric light was in use during the meeting]. But, as he said, it was not played out; and it was not going to be. He had rather an interesting point on this matter to bring before them. He had asked for the figures showing the increase in their business this year; and the information would show the necessity there was for a continual supply of gas. The increase up to that morning was 16¼ per cent. over the corresponding period of last year, or over 200 million cubic feet. People were using gas for all sorts of purposes; and they required it, he believed, more and more. [At this point, there was a sudden and very decided diminution in the illuminating power of the electric light in the room; upon which the Chairman, amid laughter, remarked that gas did not serve them like that.] The frost and cold weather was a very good thing for increasing the consumption of gas, though it entailed an enormous amount of trouble on their staff; and he took this opportunity of saying that his colleagues and himself were very proud indeed that they had such a staff and such a body of workpeople. He thought he might say of them, as had been said of the British army, that "they were prepared to go anywhere, and do anything." In the present frost, they had great difficulty in keeping the service-pipes and lamps clear; but the men were doing their work cheerfully, and without a murmur. They had had great difficulty in keeping the canal open; and he thought he might say that it was the only canal in London that was open. There were, however, 500 men employed on it. They had to get their coals up the river to Vauxhall, and they intended to do so; and while the general traffic of the river was stopped, theirs was managing to keep on, although there was a difficulty with their barges in that they were constantly being lost—the ice coming down breaking them from their moorings. On the previous day, four of their barges could not be found anywhere; but one had since been discovered, and they were searching all over the river for the others. They were, however, doing their work; and this fact spoke volumes for their officers. The second paragraph of the report also contained a passage which he desired to quote with reference to the subject of slot meters. It was as follows: "The gas companies may take some credit for conferring a practical boon on the working classes, by thus adapting the supply of gas to their circumstances; for it has been to the gas companies in various parts of the Kingdom, and not to the municipalities supplying gas, that the working people are indebted for this great addition to their comfort and convenience." He wished to emphasize this, because it was the fact. He had made inquiries of the meter makers, and had found it was the gas companies who were attending to this matter, and not the municipalities. And why should the municipalities trouble themselves to do it? With regard to coals, he had very little to say, except that they were slightly dearer; but he hoped they would come down again. They had done fairly well with coke and ammonia; but though there was a spurt in the demand for the former just now, through the cold weather, the price of coke at the end of the half year, and of sulphate of ammonia also, was very much lower than at the beginning. He thought the market for coke had been detrimentally affected by one large buyer and one large seller, in forcing up the price for some reason above what the market could bear. The price of coke for cement making was forced up last year to 13s. 6d., or an increase of about 2s., a ton; whereas the cement trade was not in a healthy state, and the result of the high price was that the cement makers used one-third anthracite in place of coke. He thought gas people ought not to wait to have reductions of price forced on them, but reduce coke with the decrease in the price of coal, so as to avoid losing trade. With respect to the fourth paragraph, referring to the works and plant, he might say that their carbonizing wages, partly through the introduction of machinery, and partly through the men working properly and fairly, had been reduced by about 10d. per ton of coal in the last four years—from about 3s. 6d. to about 2s. 8d. The fifth paragraph dealt with their Bill; but as he would have a good deal to say on this later on, he would pass it over for the moment. There were other Bills requiring careful watching; and one of them was the London County Council's new Assessment Bill. He thought that this would experience great difficulty in passing; because he believed that all the public companies in London would feel it their duty to oppose it most strenuously. He would only say, in reference to the proposed Assessment Bill, that in the case of gas companies it was an indirect tax on the consumer. Anything added to the rating of the Company was put on the price of gas, so that the consumer had to pay it indirectly; and as they wished to supply the consumers with gas as cheaply as possible, they were determined to resist any attempt to raise the assessment unfairly. The next paragraph related to the profit and the dividend. He had stated on previous occasions that their dividend was only nominally 13 per cent. Since 1876 all new capital had had to be sold, according to parliamentary requirements, by auction or tender, with the result that the rate of interest on gas stock had been reduced from 10 per cent. to less than 5 per cent. One of the gentlemen who some months ago attended before the Board of Trade to ask various things about the gas companies desired, among other things, that the rate of interest on gas capital should be reduced from 10 per cent. to 5 per cent. It was, however, so reduced 18 years ago; and one of the great objects of their Bill was to make this clear. Before sitting down, he thought he ought to make some reference to the electric light explosions—or, perhaps, the combined electric and gas explosions. There had been several in different parts of London; but the other day there was one on Southwark Bridge, which affected their Company. In the House of Commons, the President of the Board of Trade, in answering a question on this subject, said it was most desirable that the gas companies should adopt the best means at their disposal to detect and remedy any defect in their mains; and the right hon. gentleman stated that he was taking steps to call the attention of the companies to the matter. He could only inform the President that they would respond in the heartiest manner to any suggestion he might have to make; but at the same time, all possible means were adopted by their Company to detect escapes. They offered a money reward to any of their own people, or to anyone else, who would bring them notice or information of an escape; and they were also constantly looking out for this contingency. But escapes happened suddenly and unexpectedly; and sometimes there might be a little delay before they were found out. With regard to the cause of the Southwark Bridge explosion, there had been an excavation beneath their main. It was an old, but perfectly sound, Phœnix main, possibly laid 40 years ago—certainly it was down in 1880. It was laid well, and rested partly on the brickwork of the bridge; but the City authorities, when doing something to their sewers, excavated under the main, and afterwards left it unsupported. He did not say that information should be given to them whenever a passage was made under their mains; but he did ask that great care should be taken afterwards in making the ground beneath the mains solid. When they examined into this matter, they found that the main was unsupported. One could get his hand beneath it; and the earth was all loose. The surface of the ground was frozen; and the gas could not escape into the air. It therefore percolated probably through the loose earth into the electric-light conduits; and when it got there, it might be conducted anywhere. How it became ignited, however, he could not say. He mentioned this to show that the Company were quite alive to these things, and to indicate the difficulties against which they had to contend. He concluded by moving the adoption of the report and accounts.

Mr. J. EWART, in seconding the motion, said he believed the proprietors would agree with him that both the report and accounts were satisfactory in every way.

Dr. DRYSDALE expressed his belief that the success of the Company was partly due to the profit-sharing system.

A SHAREHOLDER inquired what the reserve fund was invested in.

The CHAIRMAN stated that it was in Consols, debenture and preference stocks, and such securities as Liverpool Corporation stock. To give an idea of the nature of the investment, he might state that it only paid them about 3 per cent. or rather less.

Mr. B. DONKIN asked how the reserve fund had stood in the past few years, and expressed his desire to see it still further increased.

The CHAIRMAN stated that the reserve fund before the strike stood at about £220,000, although it was worth more than that; for in realizing it they made a profit of about £40,000. They might, therefore, say that the reserve fund before the strike amounted to a good quarter of a million. It was depleted partly to pay the expense of the strike; and he might remark, parenthetically, that this was the best money they ever laid out—not only in delivering them from a tyranny, but also in promoting a feeling of loyalty and unity among the *employés* and Directors such as they could never have hoped for, and such as he had never seen anywhere else. It was also depleted partly to make up their dividend, when the revenue was not sufficient for the purpose. The price of their gas was reduced to 2s. 3d. in 1889 (the year of the strike); and they continued it at this figure throughout that year, notwithstanding the strike and the heavy expenses they were put to. The public treated them splendidly—he used the word advisedly—in bearing, with the utmost patience, all the inconvenience they suffered from an insufficient supply, and did not make a complaint about paying for the gas. The Directors therefore said that they would not throw on the public any part of the cost of the strike. The consequence was that they divided it between the insurance fund, the dividend, and the reserve fund—something like £30,000 to each; and then came the high price of coal. During 1890, and up to Michaelmas, 1891, they kept the price of their gas at 2s. 3d. They had been in hopes that they would be able to "pull through" the high cost of coal without raising the price. In June, 1892, their reserve fund had been brought down really to £37,000; and then they began to build it up. They were obliged to raise the price, however, to 2s. 6d.; but they reduced it in 1893 to 2s. 5d., and in 1894 to 2s. 4d. So that they were now within a penny of what the charge was previously. They had built up the reserve fund to £67,000. What they were really doing was adding to it about

£11,000 a year out of the divisible profits. They were entitled to divide 13¼ per cent.; but instead of doing so, they recommended the proprietors to agree to accept only 13 per cent., putting the odd ¼ per cent. to the reserve fund. They were also building up the insurance fund. It was £40,000 before the strike, when it was reduced to £12,000. But they had now increased it to £36,520. The Board would like to see the reserve fund at £100,000, and the insurance fund at £50,000, certainly; and he would not mind if these funds stood still higher. He thought, however, that there was every prospect of bringing them up to this level in a very short time.

Mr. DONKIN remarked that the reserve fund was only about a quarter of what it was formerly.

The CHAIRMAN replied that that was so; but he might say that they had reduced it for the benefit of the consumer. The fund was sacrificed in order to keep the price of gas down; and on the whole, he thought that what had been done in this matter had answered their purpose.

The resolution was then put, and carried unanimously.

On the motion of the DEPUTY-CHAIRMAN (Captain T. B. Heathorn), seconded by Mr. ROBERT MORTON, the following resolution was afterwards passed: "That a dividend at the rate of 13 per cent. per annum be now declared, and that such dividend, with the exception of the sum of £500, be apportioned amongst the three classes of stock as prescribed by the Scheme of Amalgamation, 1880; and that the warrants be transmitted to the registered addresses of the proprietors by post."

Resolutions were afterwards passed re-electing the retiring Directors (Captain Heathorn and Mr. Simpson Rostron), and the retiring Auditor (Mr. W. Westcott).

An Extraordinary General Meeting was then held for considering the provisions of the Bill promoted to obtain sanction for the conversion of the capital of the Company, and for other purposes.

The CHAIRMAN observed that, before explaining the Bill, it would be as well to state what had led up to it. The proprietors might have noticed in their reports, during the last two or three years, references to the anomaly that their capital was called and spoken of as 13 per cent., when it was really only 5 per cent.; and in their reports during the past year or two, the Directors had shown this 13 per cent. to be a fallacy. It had been suggested that the 10 per cent. stock should be converted into an equivalent amount of stock bearing 5 per cent.; but they did not see their way to do anything in the matter until, about three years ago, the Bristol Gas Company went to Parliament with such a proposal. That Company converted their 10 per cent. stock, with the assent of Parliament, into double the amount of 5 per cent. stock. It was not a sliding-scale Company. Following them came the Oxford Company, which was under the sliding-scale. In 1893, the Crystal Palace District Gas Company (which was not then a sliding-scale Company) applied to Parliament for the conversion of their stock. Parliament sanctioned the change; and from that time the Company had adopted the sliding-scale arrangement. Last year the Plymouth Gas Company were in Parliament seeking for the same power; and, so far as their 10 per cent. capital was concerned, their application was granted. He might say that, in the case of the Plymouth and Crystal Palace District Companies, no objection whatever was raised to the proposal. He did not know about the cases of the Oxford and Bristol Companies, as he was not interested in them; but in the other two, no objection whatever was raised by the Local Authorities or either Committee of Parliament. He ought to have explained at the outset that their own Bill really consisted of two parts. The first part referred to the simple conversion or duplication of their total capital—it being all ordinary capital as far as the public and the gas consumers were concerned. What they asked Parliament to do was to convert the 10 per cent. capital, amounting to upwards of £2,000,000, into 5 per cent. capital of over £4,000,000, including the "A," "B," and "C" stocks. If this process were carried out, each £100 of "A," "B," or "C" stock would be converted into £200 of stock with a statutory dividend of 5 per cent., instead of the present statutory dividend of 10 per cent., at the initial price of 3s. 6d. per 1000 cubic feet for gas. The other part of the Bill was to commute the respective rights of the "A" and "B" stockholders. This question had been brought up several times. He did not know exactly when it was first raised; but it was a good many years ago, when certain "B" shareholders said: "Could you not get rid of the difference between the "A" and the "B" stockholders, so that we may have a uniform stock?" At that time, they did not see their way to do this; but in promoting the Bill which was now submitted to the meeting, they thought they would try and make an arrangement whereby the "A" and "B" stockholders might commute their respective rights, in which case the whole concern would have one unified stock. They were not asking Parliament for any fresh privilege; and they did not expect to get any. All they were asking Parliament to do was to double their capital and halve their dividend; and therefore, as far as Parliament and the public were concerned, no difference would be brought about. A 10 per cent. stock to the amount of £2,000,000, paying 13 per cent. was just the same as a 5 per cent. stock to the amount of £4,000,000 paying 6½ per cent. The "A" and "B" question was merely a matter of internal arrangement. It had already been explained in a circular how it was that the arrangement was made originally, at the time of the amalgamation; and therefore he need not deal with this point. If the £1,850,000 of "A" and "B" stock together was converted into £3,700,000 of new capital, they would pay the same amount of dividend on it as they did at present to the "A" and "B" stockholders. They thought they might do it in this way: The dividend had been very steady at 13 per cent. for about nine years. They raised it to 13¾ per cent. in 1889, and reduced it to 12 per cent. in 1890 to pay for the strike. But it had averaged about 13 per cent. during the past nine years. The dividend to which they were entitled, with the price of gas at 2s. 6d., was 13 per cent. Some said the probabilities were that the price of gas would rise, and, if so, the dividend would fall; whereas others thought the probability was greater that the price of gas would fall and the dividend go up when they had built up their reserve fund. They therefore considered they might take the basis of the present dividends, and allocate the £3,700,000 to the "A" and "B" stockholders in such proportion as would give them, on the converted stock, exactly the same amount of dividend as they were now, and had been for some years, entitled to, or receiving. The Directors took the advice of several shareholders on both sides—shareholders in all three Companies—and they found that those representing the "B" stock thought the terms were not quite good enough. Therefore, after discussing the matter with them, and going into it very thoroughly, they arrived at a somewhat different arrangement. According to the Bill, the £3,700,000 was to be divided in this way: £1,207,692 to the holders of "A" stock, and £2,492,308 to the holders of "B" stock. But the gentlemen representing the "B" stockholders said they did not think this was good enough, and the probabilities were that the price of gas would go up rather than down. Therefore, the Directors agreed to recommend to the meeting that the converted stock should be apportioned in this way: £1,189,000 to the "A" stock, which was about £18,600 less than was put into the Bill; and £2,511,000 to the "B" stock, which was the £18,600 that was taken off the "A" stock. The Directors, in their circular, said in regard to this matter that they had come to the conclusion that this "is the only possible and, it seems to them, the most equitable apportionment." On that basis, the "A" stockholders would give up a prospective benefit. For every penny reduction below 3s. 2d., the "A" stockholders were entitled to 11s. 9d. per cent. more, whereas the holders of "B" stock were entitled to an increase of only 2s. 6d. per cent. On the other hand, if the price went up a penny, the "A" stockholders would lose 11s. 9d. per cent., and the holders of "B" stock 2s. 6d. per cent. They were now selling gas at 2s. 4d., which entitled them to a higher dividend than 13 per cent. The price of 2s. 6d. had easily carried them all through the recent troubles; and, seeing this, the Directors thought it was fair to take it as a basis. But they were quite certain that no other basis was possible. Of course, as an arithmetical possibility, they might divide £3,700,000 in fifty or in five hundred ways; but it was not possible to do so in the present instance. The "A" stockholders thought that they were giving up quite enough, and they would not give up a penny more; and if the "B" stockholders wanted more than was now proposed to be apportioned to them, they would not get it. As the "A" stockholders would not give more, and the "B" stockholders would not take less, the Directors stated in the circular that what was now proposed was "the only possible and, it seems to them, the most equitable apportionment." The shareholders would now be called upon to determine, first of all, whether they would go for conversion; and on this point he had not heard a dissentient word. No one had raised the slightest objection to the conversion of the capital from 10 per cent. into 5 per cent. stock. Everyone agreed that this was a right measure; and that was the main purport of the Bill. For this, they asked for proxies; and for the other matter, they asked for assents. They had stated in the Bill that "the holders of upwards of three-fourths in value of the 'A' stock and of the 'B' stock respectively have assented to the Bill for this Act." If three-fourths in value of the whole of the "A" and "B" stocks did not assent before the Bill reached Committee (and they had not yet done so, for they had assents at present for less than one-half), then the clause in the Bill with regard to the commutation of the respective rights of the "A" and "B" stockholders would have to be struck out. The main purpose, however, for which the Directors had asked them for their proxies was on the question of the conversion of the capital.

The SOLICITOR (Mr. Blyth) then read the heads of the Bill, remarking that it could not be altered after it was deposited until it went into the Committee of the first House before which it was to come. It was therefore submitted to the meeting as it was deposited on Dec. 21; and the alterations foreshadowed in the Directors' circular could only be made when the Bill came before the Committee of the House.

The CHAIRMAN said he would first read the resolution—the form of which could not be altered, because it was necessary to comply with the Standing Orders of Parliament—and then he would invite questions. The resolution was as follows: "That the Bill now submitted to the meeting, intituled 'A Bill to convert the capital of the South Metropolitan Gas Company, and for other purposes,' be, and the same is hereby, approved, subject to any amendments which may be made therein by Parliament, and approved by the Directors." Of course, the resolution applied to the Bill as it was; and they could not very well alter the motion. But if the "A" and "B" stockholders said they would not agree to the commutation on the terms proposed, then the Directors would have to take that provision out of the Bill, which would then simply be for the conversion of the stock. It was necessary to make this point very clear—that, although the words in the resolution "and for other purposes" would technically include everything, the Directors would take very good care that they did not include whatever the proprietors disallowed.

Mr. ROBERT MORTON seconded the motion.

Mr. FOSTER stated that, when the matter first came before him, he thought, as an "A" stockholder, that they were not getting quite enough. But he had gone carefully into the matter; and it seemed to him very desirable that they should be contented with what the Chairman had told them was now proposed. He therefore most willingly assented to it on behalf of himself and certain friends; and he hoped that all the holders of the "A" and "B" stocks would cease to be "A" and "B" stockholders, because he thought that there was a little friction sometimes between them. He regarded what was now proposed as very fair. He would like to ask the Chairman one question. When reference was made to doubling the capital, he presumed that the amount not paid up was also to be doubled.

The CHAIRMAN stated that £72,500 was ordinary stock, exclusive of premiums, which they were authorized to issue and raise. This amount of 10 per cent. stock would be converted into double the quantity of stock, and would be sold by auction; but the £600,000 of ordinary stock was inclusive of premiums. If it were to continue a 10 per cent. stock, they would sell £200,000, and get £600,000 in money for it; but if it were converted into 5 per cent. stock, they must sell £400,000 of it to get £600,000 in money. As far as capital powers were concerned, they were asking for nothing more than they already possessed; and he might add they did not intend to take anything less.

Mr. SHAND stated that he was an old "B" stockholder; and he thought the "A's" were getting very much the best of it, as regarded the commutation proposal. But for the important object of unifying

the capital, and reducing the apparently high dividend which was at present paid on the stock, he would waive any feeling he had on this question, and would endorse what had been said in favour of carrying the Bill.

The CHAIRMAN, in answer to a question, stated that they had asked for proxies in accordance with the Standing Orders of Parliament; and they had asked for assents respecting the commutation of the rights of the "A" and "B" stockholders. They had stated in the Bill that they must have the assent of three-fourths in value of both the "A" and the "B" stocks. They had not, however, yet received this proportion of assents; and if they did not get it, they would not be able to carry that part of the Bill—the proposals as to the commutation of the rights of the "A's" and the "B's." They would still, however, convert the stock; but then, as now, there would be "A" and "B" stocks.

A STOCKHOLDER remarked that there was no doubt that a good many of the proprietors were waiting to see the result of the meeting before sending in their assents.

The CHAIRMAN said that probably that was the case. In answer to an inquiry, he stated that assents could be given up to the time of the Bill going into Committee, which would probably be in about two months' time. A report of the proceedings of their meeting that day would be sent to every proprietor; and if they approved the proposals now submitted, there would be ample time for them to send in their assents. He desired to repeat that, if they received the requisite proportion of assents, the Bill would be applied for in its two parts—that relating to the conversion of the stock, and that dealing with the commutation of the rights of the "A" and "B" stockholders. If, however, they did not receive the requisite number of assents, the Directors would drop the commutation proposal, and ask for conversion only.

Sir J. JOICEY, M.P., stated that, as a "B" stockholder, he thought that that class of the proprietors were getting too little, and that the "A" stockholders were getting too much. But after hearing what the Chairman had said, and going into the matter carefully, he believed that the arrangement proposed was as fair as could be made for the "B" stockholders. He thought that many of them were awaiting the result of this meeting; and he felt sure that, when it was known that they could not possibly get any more, they would send in their assents. He was very pleased to see that the stock was going to be converted, so that what was now regarded as 13 per cent. stock would become 5 per cent. stock. He had reason to know that the continual payment of 13 per cent. created a good deal of misapprehension.

The CHAIRMAN: It is only 13 per cent. nominally.

Sir J. JOICEY, continuing, said he was quite aware of that; but misapprehension arose on the point, more particularly among the poorer classes. They did not realize that for some years past the capital had been raised by auction; and that, although a man might pay £250 or £300 for £100 of stock, all he received in the way of dividend was on the £100. He knew something about Parliament; and therefore he was glad they were not going to ask for any fresh power, as there was a great deal of feeling at the present time against gas and railway companies. He thought, however, they would have no difficulty whatever in getting their application granted, seeing what was in the Bill.

Mr. HARRIS remarked that the Chairman's arguments had been based on the idea that the dividend would continue at its present rate, or would be increased instead of reduced; but he had not put to the meeting what the result would be if, unfortunately, the dividend fell to 10 or 11 per cent. In that case, the "A" and the "B" stocks would only be of equal value; whereas at the present time there was a considerable difference between them. As a "B" stockholder, he must say that he had had considerable hesitation as to whether he should adopt the scheme; but he thought it was a very advisable one for many reasons. It was most advisable that there should be a unification of the stocks; and although he was making, as he believed, a considerable sacrifice, he was prepared to support the Directors' proposals.

The CHAIRMAN, in answer to a question, stated, with regard to the conference to which he had alluded, that the Directors had consulted two representative gentlemen—Mr. Foster, who was at the time of the amalgamation Deputy-Chairman of the South Metropolitan Company, and was the holder of "A" stock exclusively; and Mr. Shand, who was at the same time Deputy-Chairman of the Phœnix Company, and afterwards Chairman of the Amalgamated Company, and who held exclusively "B" stock. They felt they could not have consulted two more able or fair-minded men, or men who better understood the subject.

Mr. BUTLER said there was one fact which ought to satisfy the "B" stockholders. People on the Stock Exchange were pretty good judges of the values of securities; and since the proposal now before the meeting was made, the "B" stock had risen considerably more than the "A"—a fact showing the opinion of the Stock Exchange regarding the matter. He thought that the Stock Exchange price was an indication that that body thought that the "B's" were getting the best of it; but whether or not that was so, both the "A's" and the "B's" would profit considerably by the arrangement. He thought they all ought to be thoroughly satisfied.

Mr. SODEN considered that the discussion showed the desirability of the "A" and "B" stockholders agreeing to the commutation as proposed; for there was not an "A" or a "B" stockholder who had addressed the meeting who had not thought that he was getting too little. (Laughter.) If he looked at the matter strictly from his point of view as an "A" stockholder, he did not think he would receive enough; but it was in the interest of every stockholder, if he could, to agree to the commutation. It would be most desirable if they could have only one stock in the Company, and that an auction stock. In his opinion, they ought unanimously to agree to the terms proposed; and it was clear that none other would be acceptable. Moreover, they were the terms arrived at after a little grumbling on the part of all concerned.

A STOCKHOLDER said it appeared to him, as a holder of "B" stock, that, under the arrangement, not only their interest, but their capital also would be smaller. According to what was proposed, every holder of £100 of "B" stock would get £186 of converted stock. Up to 11 per cent., the "A" and "B" stockholders shared alike in dividends. He thought it was the idea of the Directors not to raise the dividend; and that being so, he could not see the advisability of making the proposed change, for the "B" stockholders were not going to receive an equivalent for what they would give up in the event of the dividend being reduced. If the Chairman could assure him as a "B" stockholder that, under the proposed arrangement, the holders of the present "B" stock would be as well off as they were now, he should be perfectly satisfied to give his consent to it.

The CHAIRMAN said he certainly thought the "B" stockholders would be as well off under the proposed arrangement as they were at present—in fact, they would be rather better off, because they would get a slightly higher dividend. What the last speaker asked for was that £100 of the "B" stock should be exchanged for £200 of the converted stock. But if this were done, the holder would get 13 per cent. instead of 12 per cent.; and the dividend of the "A" stockholder would be reduced proportionately from £15 14s. to about 13 per cent. To give £200 of converted stock for £100 of the present "B" stock would give the holder equal to 13 per cent., and would knock the dividend of the "A" stock down to 13 per cent. But in giving the present holder of £100 of "B" stock £186 of converted stock, he would be getting rather more than his present dividend. If, too, the price of gas went down, the "B" stockholder, with his £186 of new stock, would get a better dividend still. He had said that it was not the intention of the Directors to recommend any higher dividend until they had reduced the price of gas, or until the reserve fund was considerably increased. He hoped the price would go lower very soon; and, if so, they would then increase the dividend—possibly, if they could fairly do so, taking into consideration the reserve fund. At any rate, however, when the reserve fund was built up to £100,000, or something like that, the time would come to increase the dividend. He desired to point out that £186 of the new stock would give the holder of £100 of the present "B" stock a full equivalent for what he received now; but that if he were to receive £200 of the converted stock for his £100 of existing stock, the "A" and the "B" stockholders would be put on exactly the same footing.

Mr. HIGGINBOTHAM asked a question regarding an article which recently appeared in the *Globe* relative to representation of the workmen in the management of the Company by acting on the Board.

The CHAIRMAN said he would deal with this subject later on; but he thought it was desirable first of all to dispose of the question now before the meeting.

A STOCKHOLDER stated that, having heard the Chairman's explanation, he intended to assent to what was proposed; and he thought the best thing for the "A," "B," and "C" stockholders was to join hands, and sing "Auld Lang Syne."

Mr. HOUNSON said he did not intend to follow the lead which had so far been set, and state whether he was an "A," a "B," or a "C" stockholder. He stood there as a proprietor of the South Metropolitan Gas Company; and he would like the meeting to ask themselves what was best for the Company. His conclusion was that what was proposed was a grand project, not only for the South Metropolitan Company, but for gas companies throughout the kingdom. Though they were in this matter following what had been done by other companies, who had gone to Parliament, and obtained double the amount of 5 per cent. stock for their former amount of 10 per cent. stock, he believed that, as the largest gas company which had yet asked Parliament for this power, they would in future be looked to as having initiated this policy. Therefore, not as an "A," a "B," or a "C" stockholder, but as a proprietor of the South Metropolitan Gas Company, and as a shareholder in other gas companies, he gave his warmest support to the proposal.

A STOCKHOLDER said that he regarded the price which the "B" stockholders were called upon to pay to the "A" stockholders as too much. He would not hold this opinion if they might rely on the prosperity of the Company continuing. But the reverse might happen, and the dividend might be brought down. As a holder of "C" stock, he was quite satisfied with the proposals.

Mr. MACE said he concluded that, if the commutation part of the Bill was carried out, the stocks of the Company would be uniform, and all would receive one percentage of dividend, without the sliding-scale being altered.

The CHAIRMAN replied that that would be the case.

A STOCKHOLDER, who stated that he held "B" and "C" stocks, said he thought the best possible thing to be done was to agree to the Directors' proposals. He believed that the assents would now come in; and that the Directors would be able to report that the proper number had been received. What was proposed to be done had already been carried out by several of the railway companies; and he believed thoroughly in the fairness of the Directors in the apportionment of the "A" and "B" stocks.

The CHAIRMAN, in reply, said that there was not much left for him to answer. The "C" stock was not interfered with at all by the commutation proposals. This stock would simply be doubled; the holder of £100 of the stock carrying 10 per cent. receiving £200 of 5 per cent. stock, implying a dividend of 6½ per cent. As to the "B" stock, the great question was about a reverse. If the price of gas went down and the dividend increased, the "B" stock would gain; but if the price went up and the dividend decreased, the "B" stock would lose. It was a question of probabilities. He had been considerably amused at the doleful probabilities which had been mentioned. They had heard talk about the dividend going to 11 per cent.; and one gentleman had written to the JOURNAL OF GAS LIGHTING this week—after communicating with him (the Chairman) on the subject, and receiving a full explanation—who talked about a reduction of the dividend to 10 per cent. That, however, would mean that the price of their gas would go up from 2s. 4d. to 3s. 6d. which was totally improbable. If the price were to rise to 3s. 6d. or to 3s. 2d., the "A," "B," and "C" stocks would not be worth much. It would be a case of writing over their door, "The light of other days is gone." He thought the extreme range of possibility was for the price to advance to 2s. 10d., although he did not believe it was at all likely to go above 2s. 6d., seeing what they had gone through in the past few years. He could say, from a life-long experience of London gas matters, that there had been no years so difficult as the last four or five; but they had pulled through them with an average price of 2s. 4¼d. He believed that 2s. 6d. was thoroughly safe; and he thought it far more likely that the price

of gas would go down, in which case, after they had built up their reserve fund, their dividend would increase. As to the Stock Exchange estimate of values, to which reference had been made, the Stock Exchange did not know everything, or as much as the Directors; and on the Board, the "A" and "B" stocks were fairly represented. There were three Directors who held "B" stock exclusively, and three who held "A" almost exclusively, as well as some "B" stock. The holders of the "B" stock on the Board said that the original proposal in the Bill was in their opinion fair; and that they were not prepared to ask the "A" stock for anything else. They had, however, the meeting to which he had alluded; and they agreed, at the instance of some of their friends, to knock off £18,000 odd from what had been proposed to be given to the "A" stock, and to add it to the "B" stock. These were the only possible terms on which the commutation could take place. The Directors were very pleased indeed with the tone of the meeting; and they would now circulate a report of all that had been said, and would see what assents were received during the next six or eight weeks. If they did not receive the proper number of assents (A STOCKHOLDER: "You will"), they would go for the duplication of the stock only; but if they did receive sufficient assents, they would prosecute the Bill as it now stood.

The motion was then put to the meeting in the usual way, when one hand only was held up against it.

The CHAIRMAN remarked that, if the single dissentient to the resolution would see him or the Secretary after the meeting, they would endeavour to convert him.

A STOCKHOLDER inquired if assents were wanted from the holders of the "C" stock, of whom he was one.

The CHAIRMAN replied that only proxies were required from the "C" stockholders.

A STOCKHOLDER, who said that he would very likely be regarded as a simple man, desired to know how it was that when the dividend increased, the price of their gas went down. (Laughter.)

The CHAIRMAN, in reply, stated that he believed he was the author of this anomaly. Nearly twenty years ago, the price of gas was raised very materially, to meet the coal famine of that time; and it was thought unfair to throw the whole burden of the extra cost of coal on the consumers. He therefore suggested that a reward should be offered to gas companies if they would reduce their price—that, in fact, a bunch of carrots should be held before the donkey's nose, to draw him on. This suggestion was approved by Parliament, whereupon the sliding-scale was introduced, which provided that, as the companies working under it reduced their price, the dividend should be increased, and that, on the other hand, if the price rose, the dividend should fall. This was an arrangement which had made the consumer and the shareholder partners. With respect to the other question which had been raised, it was necessary that he should go into it, in consequence of the paragraph which had appeared in the *Globe*, to which allusion had been made. Perhaps he ought to explain—and he felt that his brother Directors would not mind him saying this—that the idea of promoting this Bill was his, and the scheme was practically his. There was one point which he had thought essential, and which he believed would materially help in getting the Bill passed. It was this: The public would ask what good they would derive from the Bill; and he thought they would be able to show that there was some public advantage in it. The burden of carrying the Bill through Parliament would fall on him; and he had thought they might extend their profit-sharing scheme in a manner which would be regarded by Parliament as a public advantage, in drawing capital and labour more thoroughly into accord. The great industrial question of the day was the antagonism between capital and labour. They had gone on very well themselves, for they were on very good terms with their workpeople; but he wanted to improve and consolidate this position. In the Bill as it was originally drafted, there was the following clause:—

> Subject to the regulations set forth in the First Schedule to this Act, the Directors of the Company may, at such times as they deem expedient, prepare a scheme for the purpose of enabling persons in the employ of the Company and holding ordinary stock to elect a representative or representatives to take part with the Directors in the management of the Company, and may submit the scheme to a special general meeting of the Company, duly called, with notice of the business to be considered thereat, and the meeting may adopt the scheme, either without alteration or with such alterations (not being inconsistent with the said regulations) as the Directors may assent to; and the scheme so adopted shall be submitted for the approval of the Board of Trade, and that Board may consider the same, and may either approve the same without alteration, or may suggest any alterations therein not being inconsistent with the said regulations; and if the Directors assent to the alterations (if any) so suggested, the Board of Trade may approve the scheme as altered. The scheme when approved shall be published in the *London Gazette*, and shall from the date of such publication have, during the period prescribed in the scheme, full force and effect.

This was provided for in the notice; and, as he had said, it was inserted in the first draft of the Bill. The Directors, however, thought it was not advisable to go on with the project. He thought he might say for his colleagues that there was no difference of opinion as to the principle. Some of them believed the principle was right, but admitted that there were difficulties in carrying it out. Others held that it would not work, and that, if it were put into operation, it would be extremely difficult to abandon it. He desired to say this of his colleagues: They only claimed to possess ordinary intelligence, and to be honest and independent—each and all of them. But it was absurd to suppose—it was impossible—that seven men cast in different moulds, and with different experiences of life, should see eye to eye on every subject. If they ever did have a Board that never had a difference of opinion, they might depend upon it that all but one of its members were dummies; and he would be very sorry indeed to think this of his colleagues. The very fact that they differed from him on this point raised them all, he thought, to a higher position than if, pulling together, they were merely following the lead of one man. The difference of opinion regarding the point was, he thought he might say, not as to the principle, but in connection with the working of the proposal. One objection had been urged, that no one section of shareholders ought to have a privilege superior to any other section; and he himself agreed to this, unless it were to the benefit of the general body of proprietors to give a special privilege or advantage to any section. His friends had raised difficulties as to the working of the proposal. To him, this had created this sort of feeling: If anyone told him that there was a lion in the way, he did not say that he would go and fight the animal, but at any rate he would like to look at him; and in ninety-nine cases out of a hundred, there would be no lion, or it would be afraid and run away. In the one case, he might get killed. The clause was now out of the Bill; but as he was perfectly satisfied that the difficulties which had been urged could be overcome, and that the proposal could be made to work to the advantage of the Company, he could not change his conviction. He could not drop what he felt to be right, although it was not for him to endeavour to force anything on the proprietors. If the latter did not think it was advisable, there was an end of it; if they thought it was right, the Directors would probably try and find a means to bring the matter about. What had led to it? As they might be aware, he was a member of the Labour Commission. He attended 121 meetings of that Commission. There were 100 of them for hearing evidence, lasting about five hours each. He then heard and saw a great deal of the tendency of the working classes; and he had the great privilege of associating with some of the most honest, able, and honourable men among the labour leaders that it had ever been his privilege to meet. He might mention men of the stamp of Thomas Burt. He (the Chairman) gave evidence before the Labour Commission; and one part of his evidence related to the profit-sharing scheme. One of the members of the Commission seem to think that the scheme was very good as far as it went; but he asked, "Should you have any objection to representatives of the workmen sitting on the Board of Directors?" This came to him (the Chairman) as a surprise, as he had never heard of such a thing before. He reflected a little, and then said, "No; but we cannot do so without an Act of Parliament, and as we are not going to Parliament, it is of no use talking about it." That was in 1892. He had watched very closely, and had read everything he could get hold of showing the drift of the labour movement. In signing the report of the Labour Commission, he had thought it right to add that he did not consider that the course pursued by the great majority of trade associations—by which he had meant both sides—was calculated to produce industrial peace; because to his mind it seemed that these trade associations were dividing labour and capital, employers and employed, into opposite camps; and it appeared to him that the best solution—he would not say the only one—would be an extension of the principle of partnership. The more thorough and complete that principle could be made, the better. While speaking of the existing antagonism, he might refer to the deputation which waited upon Mr. Asquith two or three weeks ago, when some 300 representatives of Trades Unions were present. It seemed to him that the spirit animating the deputation was antagonism to capital—to get all they could out of it, and with very little regard for the interests of the other side. The Company's profit-sharing scheme, which was introduced five years ago, and which really led to the strike among their men—for the labour leaders said that it would not do, because it would bind the men to the Directors, and they therefore endeavoured to kill it, although they did not succeed—would do very little good, if it merely meant a distribution of 5 or 6 per cent. in the way of addition to the men's wages. The Directors, however, made a proviso that, if the men chose to leave any portion of the annual bonus with the Company, they would take care of it, and allow 4 per cent. interest for it; and he had been very pleased and gratified to find that, year after year, nearly half the men left the bonus with the Company, with the result that it now amounted to over £31,000. When, too, they were issuing stock to their consumers, they told their workpeople that, if they liked to take up stock to the amount of £5—for which they had to pay £12 or £13—they could do so; and at the beginning of last year, they had about 30 or 40 of their men who had invested some £4000 in the Company's stock. He was very well satisfied with this; but they wanted more. They desired to create a closer tie and deeper interest in their men; and they therefore said last year: Instead of your bonus being free to be all withdrawn on the 1st of July, if we increase the bonus to 6 per cent., will you allow half the amount to be invested in stock out of your control, and the other half to be available only for withdrawal? They left this matter quite voluntarily; but nearly all the men chose the 6 per cent., with the result that at the present moment they had about 2000 of their people stockholders in the Company who had voluntarily increased their purchases to the amount of about £15,000. That was the amount of stock held in the Company by about 350 of their men. The half of the bonus—amounting to £2 or £3 per man—not being enough to enable these men to have independent holdings, was invested in the names of trustees; and about £4000 was thus invested on behalf of 1863 men. What would happen was that, in the course of three or four years, their workmen would have invested in the Company about £50,000—that was, if they continued to show confidence in the Directors. The question then arose whether this section of the proprietors should have special representation in the management of the Company. ("No, no.") It was a novel idea, he knew. A stockholding employee would take a greater interest in the Company than the ordinary employee; and he had the opportunity for doing more for it than the other proprietors. He thought he might say that one reason for the prosperity of their Company was that its principal officers had for half a century had a direct pecuniary interest in its welfare; and that being the case, they had done more than they otherwise would to increase its prosperity. Therefore he desired to see the principle further extended. What he suggested was that, in the course of four or five years, when their workmen held about £50,000 in the stock of the Company, they should be able—if the Directors and proprietors thought it advisable, and the Board of Trade approved—to elect a representative of their own to sit on the Board; and that power for the purpose should be taken in the Bill. They could not be in the position of ordinary Directors altogether—that was quite out of the question; but he felt satisfied that they could help the Company very materially. It would also be—and this he considered of very great importance—an extension of the principle of partnership; not merely partnership in profit, but also in the management and the responsibility. One great drawback of working people was that they had had no experience of the

difficulties of dealing with capital or its management. It might be said that they had not asked for it; but he did not like to wait until he was asked for a thing. The community might be divided into the "haves" and the "have-nots." The workpeople were to a great extent the "have-nots;" and they were being imbued with the notion that capital was their enemy. What he wanted was to make them the friends and defenders of capital. The only way to do this was to give them a participation in it; and if they could convert workpeople from "have-nots" into "haves," the latter would have an interest in protecting property, and would be among its best defenders. But certain safeguards would have to be provided in connection with this representation. They did not think that any workman should be qualified to be a representative of his fellows. They would provide, in the first place, that there should be no possibility of such representation until £50,000 was invested in the Company by their men; and that then, if the Directors thought desirable, they might introduce a scheme which should provide that no man should be eligible as a representative of the men unless he had invested at least £100 in the Company and had been seven years in their service. As to fees, the man who was appointed as a representative would have to work five days a week, and on the sixth day his fees must approximate to the amount of his ordinary wages. He had consulted with some of the old men on this matter; and they held that the amount to be paid in fees ought not to much exceed what would be paid as regular wages. There would also be the proviso that the scheme should be for three years only. If it were found not to work well, it would thus expire by simple effluxion of time. If, however, it was found to succeed, the Directors must come for fresh authority from the proprietors, and present a new scheme to the Board of Trade. It had been said that, if it was once started, they would never be able to abandon it; but he was prepared to say unhesitatingly that, if the arrangement did not work, it would have to stop. He knew a great deal about workpeople, and he had not the least fear that they could stop it without any difficulty whatever; but he had a strong feeling that, instead of it stopping, the arrangement would continue. It was rather singular that just at this time he should have had placed in his hands a copy of the *Forum*—an American publication. In America they had this same difficulty to deal with. The *Forum* contained an article entitled "Stock Sharing as a Preventive of Labour Trouble." It was written by Mr. Louis R. Ehrich. The writer said: "When businesses were small, the workman knew his employer well, saw him frequently, worked at his side, could understand what had given him a higher position; yet he did not feel that a great social chasm yawned between them. The tie was human, based on actual acquaintance between man and man, born of the daily living touch of men actually working together. It represented something higher and better than a mere money wage. It represented loyalty, the devotion of man to man, the willing obedience to greater knowledge and higher ability, the sense of intelligent human co-working which sanctified and consecrated the strain of daily toil." Then, the article went on to state that the advent of great corporations had "given the death blow to the old spirit of loyalty which prevailed, between employer and employed, and which, in fact, was the spiritual cement that held society together." Further on the writer said: "Society cannot be tied together by dollar-bills. Yet corporate life and the concentration of capital in large enterprises are bound to continue and to expand. A new condition must be introduced which, in some degree, can take the place of the man-to-man loyalty of the past. To me there seems but one solution [and the words following were italicized]: *Make the employee loyal to the corporation; make him a stockholder, and give him a representation on the Board of Directors.*" What he (the Chairman) wanted to see, and what he was working for in the proprietors' interest as well as his own, was peace between employer and employed. They had succeeded so far in doing good work; but mere peace was not sufficient. There was peace between France and Germany, there was peace between some of the great unions and associations of masters; but there was no good will. They wanted to see peace and goodwill between man and man; they wanted to create peace and confidence between them. The supreme evidence of confidence was trusting their employees so far as to give them a share in the management of the Company. If it was right and proper, the thing would go on; and all he would say in conclusion was that he would be delighted if the South Metropolitan Company were to have the honour and advantage of doing this work. He thought that the feeling of the Directors was that they would like an expression of opinion on the part of the proprietors, whether they would approve the scheme or not.

In answer to a Stockholder,

The CHAIRMAN repeated that the clause was out of the Bill. How the paragraph got into the *Globe* he did not know. It stated that he had been urged to bring this matter forward by some of his Radical friends; but there was not an atom of truth in such a statement. That the question had been discussed at the Board, was quite true. Parliament might ask why the clause had been struck out of the Bill: and in that case, he should make a clean breast of it. It was possible that Parliament might say, "This clause would be a public advantage; and it would weigh with us." If the Committee said, "If you will put that clause in, we will pass the Bill," the Directors must call the proprietors together again. All, however, that they were desired to vote on in the present condition of the Bill was the question of the conversion of the stock and the commutation proposal.

Considerable discussion followed on the question at issue; the *pros* and *cons* of which were dealt with by several speakers.

Mr. HARRIS proposed a resolution expressing the opinion of the meeting that it was desirable that a clause dealing with the matter should be inserted in the Bill.

Mr. D. STOCK seconded the resolution, and heartily supported the proposal.

Mr. M'LAREN said it had been admitted that there was a division on the Board on the subject; and he thought that the proprietors would like to hear some expression from those members of the Board who were against it, and their reasons for opposing it. The matter had been sprung on the proprietors, for there was no reference to it in the notice convening the meeting; and it would be unusual therefore without notice for a resolution to be submitted.

The CHAIRMAN, in reply, observed that, as to the matter being sprung on the meeting, it was not his doing. The paragraph appeared in the *Globe* without his knowledge or approval; but the fact that it was there, rendered it necessary that the subject should be fully explained. It was far better that these things should be dealt with openly. He had endeavoured to give the opinion of the other Directors, but not with the idea of preventing them from expressing their own views. There was not the slightest feeling on the part of any Director that they would object to sit with a workmen's representative; but some of them had a fear—an honest fear—that the arrangement would not work well. His answer to that was that, if it did not work well, it must be abandoned. If the proposal were agreed to, he should point out to the men that its success would depend on their own selection; and he believed that they would rise to the occasion, and send a representative who would look after the interests of the Company as a whole, and not merely a class interest. If they did not rise to the occasion, the thing would fall through.

Mr. JOHN EWART said he felt at considerable disadvantage in answering, as he thought he was doing, for the majority of the shareholders. It was so late in the afternoon that it was impossible to go fully into the objections which they thought existed against the proposal; and it was always a great difficulty to follow the Chairman, as he had the voice of the meeting. He did not, however, think that it was right for the meeting to separate without some expression from the Directors who did not see eye to eye in this matter with Mr. Livesey. The Chairman had skated over a good deal of thin ice, and had minimized the difficulties which seemed likely to arise; and he had praised highly the advantages which he thought would ensue. The matter had been before the Board for months, and had been put before them in every way; and in the course of the discussions, the majority had not seen any reason to alter the opinion which they formed in the first instance. It was only out of regard to the Chairman that it was introduced in the advertisement of the Bill; and on further discussion, seeing no reason to alter their view, a majority of the Board were in opposition to the Chairman. He could not quite agree with the Chairman as to their not differing in principle. They did in some respects. They thought there was a principle involved in giving one section of proprietors a greater representation than others. They thought the question of workpeople shareholders was fairly met by a clause in the Bill reducing the amount of stock conferring voting power. But beyond that, as the Chairman had said, they believed that the workpeople were thoroughly satisfied with their position in the Company. There was compulsion put on them to invest part of their savings in the stock of the Company; but there was no compulsion on them to retain that stock after it was passed into their names.

The CHAIRMAN observed that, if they disposed of their stock, they would not have representation.

Mr. EWART, continuing, stated that the further difficulties to their mind were very considerable. There was the difficulty of selecting good men. The Chairman had mentioned the case of very prominent men, who were first-rate; but the Directors had also in mind a very considerable number of other representatives of workmen, who did not stand on the same footing as Mr. Burt. What safeguard was there that they would get the best man? The probability was that the man who talked most, and put himself forward most, would command the votes of his fellow-men. Another great difficulty would be that the workmen's representative would come on the Board on Wednesday and attend the meeting, and the next day he would go back and be a stoker, or whatever else he might be; and he would be under the foremen and other officers of the Company. It would be more than human nature could stand to allow himself to be ordered about by these officers. He would say: "I am a Director; why should I be ordered about by this and that foreman?"

The CHAIRMAN: The foreman could discharge him.

Mr. EWART: Yes; but that would create another difficulty. A further difficulty would be that the present Board would be tying the hands of their successors. According to the scheme, the arrangement would not come into operation for four or five years; but the present Board might not then be there. They knew how their Chairman fought all difficulties. If, however, Mr. Livesey were not in the chair, but someone else, there might be very great difficulty in putting a stop to the arrangement. Beyond all that, it appeared to him (the speaker) that, if it was necessary to put so many safeguards in the Bill to guard and shield the proposal, it was a confession that it would not work well. He knew that these were the objections which the majority of the Directors entertained.

A STOCKHOLDER said he did not see how the matter could be brought before the meeting, as it was not in the notice calling it or in the Bill. Before the next meeting, the proprietors could think over it; but he held that they ought not to be asked now to vote on the resolution.

The CHAIRMAN said he thought these remarks might very well conclude the meeting. The thing was thoroughly thrashed out, as it was bound to be after it had been referred to in the *Globe*. He would do his best for the Company in the future, as he had done in the past. He believed that the matter would have helped him very materially in carrying the Bill; and it might possibly come up yet, in which case the proprietors would be called together specially to deal with it. He was very well satisfied, from his point of view, with the expression of opinion that had taken place; and he was not without hope that those at present against the proposal might be converted.

Mr. SHAND then moved a cordial vote of thanks to the Chairman and Directors.

Mr. SODEN seconded the motion; and it was unanimously carried.

The CHAIRMAN, in returning thanks, said he had no doubt the Board would continue to work well together for promoting the Company's interests; and he had no fear that those interests would suffer. He proposed a vote of thanks to the officers, who, he said, thoroughly deserved the confidence and thanks of the proprietors.

The motion was carried by acclamation; and the proceedings ended.

Parish Lighting Company, Limited.—A Company has been formed under this title, with a capital of £15,000, in £5 shares, to light with gas, electricity, or other illuminants, the township of Chester-le-Street, Durham, and the neighbourhood generally.

BRENTFORD GAS COMPANY.

The Half-Yearly General Meeting of this Company was held last Friday, at the Charing Cross Hotel—Mr. HOWARD C. WARD presiding.

The SECRETARY (Mr. W. Croxford) read the notice convening the meeting; and the Directors' report and the statement of accounts, of which a summary appeared last week, were taken as read.

The CHAIRMAN, in moving the adoption of the report and accounts, remarked that they were certainly such as ought to give the shareholders considerable satisfaction; they were indeed very favourable. As to the sale of gas, during the portion of the half year ending at Michaelmas, the increase, compared with the corresponding period of 1893, was 9½ per cent.; but the weather suddenly changed so extremely mild that the 9½ per cent. was turned into 6¼ per cent. up to Christmas, which was a fair average increase. There was one matter in regard to the business that was peculiarly gratifying to the Directors, and that was the great increase in the demand for automatic meters. He believed this system was introduced into the Metropolis—certainly it had been pushed very greatly—by their friend Mr. George Livesey, of the South Metropolitan Gas Company; and at the meeting of that Company on the previous Wednesday, Mr. Livesey referred to the large addition to the number of their consumers during the half year—about 9000 of them being penny-in-the-slot customers. He (the Chairman) alluded to this to show the shareholders what their Company had been doing during the same time. They had had, in the six months, an increase of 1517 meters, and 1186 stoves; the increase of consumers on the prepayment system being 1312. The South Metropolitan Company's increase was 9103. But they carbonized about six times the quantity of coal that the Brentford Gas Company did; and if the 1312 was multiplied by six, they would relatively be very little behind the South Metropolitan Company in the rate of increase in prepayment meters. This system was introducing to the gas companies a class of customers whom they had scarcely tapped before, and whom they found would be really profitable. It was quite wonderful the quantity of gas these people consumed. As to the price of gas, he said that, at Midsummer last, the Directors saw their way to making a reduction of 2d. per 1000 cubic feet; and, after having had before them the accounts for the half year ending December last, they had been able to make a further reduction of 2d. Therefore, within six months, they had reduced the price by 4d., which, putting it roughly, represented £20,000 a year to the consumers. This reduction would enable them at Midsummer next to advance the rate of dividend from 11½ to 12½ per cent.; but the Directors thought it would be wise and good policy—looking especially to the circumstances of the Company—to be content to increase the dividend by ½ per cent., and to commence the formation of a reserve fund by putting the other ½ per cent. on one side, and gradually accumulating the fund. The Company had never had a reserve. They had always been a Company that was overloaded with capital by reason of their straggling district. The rental per mile of main was much less than in the case of any other Metropolitan or Suburban company. They had always, too, used their undivided profit as floating capital for the benefit of the Company. The time had now come, when, in the interests of the concern, they ought to be forming a reserve fund. The ½ per cent. would amount, with their present capital, to about £1475 in the half year; and it would be much better employed in this way than in increasing the dividend to the very extreme. The report spoke of the depression there was in trade. They all knew this only too well, and hoped trade would revive, and then they would realize better prices for residuals, although they had not much to complain of. Alluding next to the sale, by tender, of £30,000 of new stock in September last, he said the Directors fixed the minimum price at £165; they thought it would not sell if they put it at too high a figure. A great many of them tendered at considerably above £165. He himself tendered at £170; but he did not get any of the stock. He believed the stock at present stood at about £188 or £190, which was extremely gratifying. The sale brought to the Company a premium capital of £21,420, which made the premium capital that was earning money, but receiving no interest, £84,720, in addition to which there was the premium of £2925 on the loan capital—making together rather more than £87,000. As to the inclined retorts at the works, they continued to give them very satisfactory results—that was to say, they found them very economical in working, very efficient, and they were, by degrees, getting rid of the horizontal retorts. Putting it roundly, with the settings they had and those about to be put up, they would have something like half their retorts on the inclined system. There was a statement in the report that they were altering the horizontal retorts in No. 4 house at the Brentford works to inclined ones, and that at the Southall works a new house for 18 beds on that system was in course of construction. As a matter of fact, they had proposed to put at present six beds into the Southall house, and to alter the horizontal retorts in the No. 4 house at Brentford. However, the present severe weather had not entered into their calculations; and as the work had been put off so late, they could not alter the horizontal retorts in time for next winter. They would, therefore, now have to erect twelve beds of inclined retorts, instead of six, in the new house at Southall. During the half year, their good friend and valued colleague Mr. Edward Walmisley died. In pursuance of their usual practice, the Directors immediately considered the selection of a gentleman to fill his place; and they came to the conclusion that one so largely connected with gas as Mr. Basil T. Makins would make a most efficient Director. Looking next at the accounts, perhaps the most pleasing feature in the revenue account was meter and stove rental £4477, as compared with £3910 in the corresponding half of 1893. This was an increase of 14 per cent., which was very good indeed, and which gave them the promise that they would increase rather faster than they had grown in some years. Perhaps the shareholders would like to know how the present weather was affecting the business; and he would give them the figures referring to the consumption of gas in the past three weeks, and the aggregate since the 1st of January. The increase in the week ending Jan. 26 was 10½ per cent.; Feb. 9, 23 per cent.; and in the current week, 36 per cent. These figures were in comparison with the amount of gas sent out in the corresponding periods of last year. The aggregate increase since the beginning of January was 20 per cent. The shareholders, however, must not consider this was all profit, because an increase to this extent rather upset their calculations with respect to coal. They were fortunate in getting the coal; their contractors sending it in pretty rapidly. But they could not get their coal in by water, as many other companies did; it all had to be carted. The extra cost of the additional coal would be nearly 4s. per ton; so that the enormous increase in the consumption of gas was not all profit. The simple result of the half year was this—that they had obtained their coal a little cheaper, and they had been fortunate with their residuals, although trade had been so bad. The surplus, after paying the dividend that was recommended for the half year, was £9240; and, adding this to the balance of undivided profits from the previous half year, they carried forward a balance of £38,607, which ought to be very satisfactory to all the shareholders.

Mr. J. ORWELL PHILLIPS seconded the motion.

Mr. W. HUGHES inquired if the proposed reserve fund would be invested outside the Company, and so be made a real reserve.

The CHAIRMAN replied that they must do so; and they could not put anything to reserve except they took it out of the money which they could divide among the shareholders. In reply to Mr. A. Thomson, the Chairman also stated, with regard to the issue of the £30,000 of new stock, that the total amount obtained for it was £51,456. The lowest price to receive an allotment was £171; about £171 15s. being the average.

The motion was then unanimously carried.

A resolution was next passed declaring dividends at the rates per annum of 5 per cent. on the 5 per cent. preference stock, 11½ per cent. on the consolidated stock, and 8½ per cent. on the new stock.

The retiring Directors (Mr. H. C. Ward, Mr. Ulick J. Burke, and Mr. R. J. N. Neville), and the Auditors (Mr. J. W. Field and Mr. M. F. Monier-Williams), were re-elected.

Colonel MAKINS moved that a cordial vote of thanks be given to the Chairman and his colleagues and the officers for their conduct of the affairs of the Company during the past half year. He remarked that he felt fully qualified to make a motion of this kind, because he happened to have the pleasure of the acquaintance, and he thought he might also say the friendship, of every member of the Board; and he had the honour of working with three of the members at another place not very far from where they were assembled; and their work there was—he would not say either more or less—as successful as that which they had accomplished for the Brentford Company by their efforts. He asked to be permitted to make one personal allusion, and that was to thank them very heartily for placing him in what he felt to be a proud position that day, in seeing his son sitting among them as a Director of the Company. Of course, the remarks of a father were liable to be partial. But he thought he might say this, that, if breeding had anything to do with the production of a good gas director, the Directors' junior colleague ought to make a good one, if he did not "throw back;" because his two grandfathers were Gas Directors, and his father was also one. He had therefore been brought up in an atmosphere of gas direction. If he found he was unable to serve the shareholders as he ought to do, he would not seek to retain the position. But as long as he had the confidence of the shareholders, he would do his best to serve the interests of the Company. He (Colonel Makins) ventured to think that the policy the Chairman had enunciated—the creation of a reserve fund—was a very conservative and wholesome policy to follow. Some gas companies were allowed to set aside more than their dividend to form a reserve fund; but in this Company he believed that was not so. There was nothing so undesirable in connection with the dividend of a gas or any other company as that it should be subject to violent fluctuations; and if they had a reserve to fall back upon to make up the dividend for the time being, it was a very great boon to the shareholders, especially to small holders, to whom a diminution in the dividend might be a very serious matter.

Mr. THOMSON seconded the motion, which was unanimously passed.

The CHAIRMAN briefly responded on behalf of the Board and the officers.

CRYSTAL PALACE DISTRICT GAS COMPANY.

The Half-Yearly Report and Accounts.

In the report which the Directors of the above Company will present to the shareholders at their meeting next Friday, they express satisfaction in being able to state that, notwithstanding the reduction in the price of gas from Midsummer last to 2s. 8d. per 1000 cubic feet, which benefited the consumers to the extent of £1700 in the half year, the balance of profit is sufficient to pay the full dividend to which, under the sliding-scale, the proprietors are entitled, and to add a small amount to the undivided balance. The demand for automatic meters was well maintained throughout the half year; and the Directors state that the success of this system fully justifies its continued development by the Company. In accordance with the Company's Act of 1893, an additional dividend of one-eighth, or 2s. 6d. per cent., may be declared for every penny at which gas is sold below 2s. 10d. per 1000 cubic feet. The authorized dividend is consequently at the rate of 5¼ per cent. The Directors therefore recommend that dividends be declared for the past half year at the following rates per annum: 5 per cent. on the preference stock, and 5¼ per cent. on the ordinary stock, less income-tax. The accounts accompanying the report show that the gas-rental amounted to £57,011; meter and stove rental, to £1493; the sale of residuals, to £20,074; and the total receipts, to £78,607. The manufacture of gas cost £49,496 (£31,743 being for coal and carburine); its distribution, £5018; and management, £2922. The total expenditure being £61,670, there was at the close of the half year a balance of £16,937 to be carried to the profit and loss account. The Company have at rent 1733 automatic meters, 3337 ordinary stoves, and 839 stoves on the automatic system. The works, under the able management of Mr. Charles Gandon, M.Inst.C.E., carbonized 45,600 tons of coal and cannel, and used 30,439 gallons of

carburine, in the past six months. The quantity of gas made was 461,567,000 cubic feet, of which 430,030,000 cubic feet are accounted for. The estimated production of residuals was as follows: Coke, 547,207 cwt.; breeze, 4858 yards (102,018 bushels); tar, 456,005 gallons; ammoniacal liquor, 8444 butts. There were 300 tons of sulphate of ammonia made in the half year, of which 173 tons were sold.

BROMLEY GAS COMPANY.

The Half-Yearly Report and Accounts.

In the report to be presented by the Directors of the above Company at the half-yearly meeting on the 28th inst., they state that the consumption of gas continues to advance satisfactorily; a comparison of the six months ending Dec. 31 last with the corresponding period of 1893 showing an increase of no less than 7½ million cubic feet, or equal to about 8 per cent. The accounts accompanying the report show a profit-balance of £6309, out of which the Directors recommend the declaration of dividends at the rate of 11½ per cent. per annum on the ordinary 10 per cent. shares, and of 8½ per cent. per annum on the ordinary 7 per cent. shares, amounting together to £5723; the balance of £586 to be carried forward. During the past half year, the remainder of the large retort-house was altered to the regenerator system of firing; and the carbonizing plant is now equal to the production of 50 per cent. more than the present maximum daily make. Oil-gas plant on the Peebles system has been erected; and, but for an unfortunate accident, it would have been in operation in the latter part of December last. The plant, however, is now at work, and will, it is confidently hoped, prove of great value, both to the Company and to the consumers. During the coming summer, further capital will have to be raised, to make additional enlargements and improvements, in view of the daily increasing demand for gas. The works, which are under the supervision of Mr. W. Woodward, are stated to be now in very good and efficient order and condition. The quantity of coal and cannel carbonized in the six months covered by the report was 10,161 tons; the bulk of gas made being 99,848,000 cubic feet, of which only 3,023,400 cubic feet are not accounted for. The residual products were: Coke, 10,101 chaldrons; breeze, 816 chaldrons; and tar, 98,166 gallons—sulphate of ammonia to the amount of 81 tons 10 cwt. 3 qrs. being made. The receipts for gas were £14,532; the rental of meters brought in £371; and the sale of residuals, £5006—the total receipts being £20,093. The manufacture of gas cost £10,658 (coal figuring for £7905); its distribution, £203; management came to £1387; rates and taxes, to £1099; and the total expenditure was £13,715—leaving a balance of £6378 to go to the profit and loss account. After meeting the interest on mortgage bonds and the temporary loan, there is left the above-named balance of £6309 available for division.

PROVINCIAL GAS AND WATER COMPANIES.

Continuing the summary of the reports and financial statements of Provincial Gas and Water Companies which have been received, we have this week to notice the following.

Gas Companies.

The half-yearly general meeting of the Airedale Gas Company was held on Monday, the 11th inst., when the Directors presented accounts which showed that, while a profit of £714 had been realized in the six months ending June 30, in the second half of the past year it rose to £1067; making a total of £1781 for the twelve months. This was an improvement to the extent of about £300 on the year 1893. Practically, the revenue sides of the two accounts are the same for both years; as what was gained in 1894 by an increased sale of gas, amounting to close upon £200, was lost by the depreciated value of residual products. On the other hand, the manufacturing expenses were brought down from £3345 in 1893 to £3050 last year; the principal saving being in the lower cost of coal. The leakage of gas was also reduced about 4 per cent. during the year; although it is still high, in consequence of the interference with roads for sewage connections, &c. The amount available for distribution was £1072; and the Directors recommended a dividend at the rate of 5 per cent., less income-tax.

The business of the Barnet District Gas and Water Company continues to progress. The balance on the gas revenue account for the past half year is £3244; and on the water revenue account, £5423. The balance at the profit and loss account (net revenue) amounts to £15,848, out of which the Directors recommend the declaration of a dividend, less income-tax, at the rates per annum of 9 per cent. on the "A" and "C" stocks, 8 per cent. on the "B" stock, and £6 6s. per cent. on the "D" capital gas and water stocks.

In their annual report, the Directors of the Barnsley Gas Company make graceful reference to the late Mr. John Hutchinson, the Secretary and General Manager, whose death, as will be remembered, has taken place since the last meeting of the shareholders. For 41 years, says the report, Mr. Hutchinson had been "a faithful and valued adviser of the Company." As mentioned in the JOURNAL at the time, the Directors have filled the office by the appointment of Mr. W. W. Hutchinson; and they feel assured that, having regard to his long connection with, and intimate knowledge of, the affairs of the Company, the shareholders will approve of their action. With reference to the accounts, the Directors recommend the declaration of dividends, which, with the interim payments, will make 8, 6, and 7 per cent. for the year on the various classes of stock and shares.

The accounts to be presented to the shareholders of the Bath Gas Company at their half-yearly meeting next Friday, show a decrease in the gas-rental in the six months ending Dec. 31 last. There were, however, special reasons for this—one being the reduction in the price of gas to the extent of 2d. per 1000 cubic feet, which took place at the commencement of July; the other, the exceptionally mild weather prevailing during the months of November and December. In the first three months of the half year, there was an increase in the consumption of gas. The mildness of the season also kept down the price of coke—affecting the receipts to a considerable extent; and there was a reduction in the revenue from sulphate of ammonia, owing to the unsatisfactory condition of the market. The receipts for gas amounted to £24,883; the rental of stoves, meters, and fittings, to £918; residuals, to £5600; and the total receipts, to £31,660. The expenditure incurred in the manufacture of gas came to £19,249 (including £13,170 for coals); distribution cost £2223; management, £1427; and the total expenses were £24,799—leaving a balance of £6861 to be carried to the profit and loss account. The sum available for division is £13,198; and the Directors will recommend the payment thereout of the maximum dividends. Under the supervision of Mr. C. Stafford Ellery, the works carbonized 20,223 tons of coal; the residuals produced being 13,118 tons of coke, 999 tons of breeze, 1014 tons of tar, and 562,000 gallons of ammoniacal liquor—the make of sulphate being 168½ tons.

At the half-yearly general meeting of the Bristol Gas Company next Friday, the Directors will have the pleasure of announcing that, notwithstanding the reduction of 2d. per 1000 feet in the price of gas as from June last, there remains, after paying the dividend on the ordinary stock and the debenture interest, a balance of profit of £5928 on the working in the six months ending Dec. 31 last. This amount, added to the sum brought forward, allows of £10,000 being carried to the reserve fund, and of £10,721 being placed to the credit of the next half-year's account. The approval of the proprietors will be asked to the contribution of a sum not exceeding £500 per annum by the Company towards an officials' superannuation fund. The Directors will recommend the declaration of the maximum dividend at the rate of 5 per cent. per annum, subject to deduction of income-tax. The accounts accompanying the report show that a sum of £100,042 was received for gas; £2227 for rental of meters and stoves; residuals produced £27,564; and the total receipts were £130,175. The manufacture of gas cost £78,862 (coals and oil figuring for £47,493); its distribution, £4451; management, £5087; and the total expenditure came to £96,342—leaving £33,833 to go to the profit and loss account. In the corresponding half of 1893, the balance was £38,547. In the production of gas, 82,435 tons of coal and 6176 tons of cannel were carbonized; the estimated quantities of residual products being as follows: Coke, 52,655 tons; cannel coke, 3773 tons; breeze, 6803 tons; tar, 909,395 gallons; ammoniacal liquor, 2,123,993 gallons.

The Directors of the Bromsgrove Gas Company reported, at the meeting of the shareholders last week, that there was an available balance of £1062 from the revenue account, out of which a dividend of 5 per cent. on the ordinary shares, and $\frac{7}{10}$ of 5 per cent. on the "B" shares was declared. This will absorb £740; and £150 is to be transferred to the reserve fund—leaving £172 to be carried forward. The affairs of the Company show a satisfactory improvement; and it is anticipated that by Midsummer the Directors will be in a position to reduce the price of gas.

Addressing the shareholders of the Chester Gas Company at the half-yearly meeting a few days since, the Chairman (Mr. J. Gamon) referred to the prosperous condition of the concern, and stated that their gas sales were steadily going forward. Whereas in 1892 they sold 167½ million cubic feet in round numbers, in the past year they had sold 170 millions. Since July, 1893, the price of gas had been reduced; and there had been a slight diminution of revenue in consequence. It ought to be satisfactory to the consumers to know that they had received last year in discounts off their gas accounts the sum of £1305. In 1893 the Company obtained 68 additional consumers; and in 1894, 43. Having referred to the increase in the use of gas-cookers and fires, and the introduction of prepayment meters, the Chairman made some remarks with regard to the electric lighting contemplated by the Corporation, the competition of which he does not fear, provided it is fairly carried on. The report (which was noticed in a previous issue) was adopted; and dividends of 10 and 7 per cent. were declared.

The Directors of the Dover Gas Company, in their report, describe the past half year as being remarkable in the history of the Company, in consequence of the large extension of the use of the incandescent gas-burner. The discovery of this mode of lighting, they say, has come at a propitious moment; for although in itself no additional source of profit, it will be of the most valuable assistance to the Company in the approaching competition with the electric light, which it rivals in brilliancy and power, while its cost, both in respect of supply and fittings, bears no approximation to the expense of lighting by electricity. There has been a fair increase in the consumption of gas during the six months; and the general result of the Company's operations has been financially successful. The Board recommend the declaration of the full dividend allowed, which will leave about £70 to be carried forward, after providing everything necessary for keeping the works in a proper state of efficiency. The revenue in the six months totalled to £15,875; and deducting the expenditure, a profit of £2752 is shown.

The accounts of the Londonderry Gas Company for 1894 show that the revenue derived from all sources reached £15,364, and that the expenditure amounted to £10,683; leaving a net profit of £4681, from which the Directors propose the payment of a dividend of 10 per cent., free of income-tax. As from the 1st ult., the price of gas has been reduced by 3d. per 1000 cubic feet to private consumers; and by 5s. per lamp to public bodies. This reduction, on a similar consumption to that of last year, represents a sum of £780, in favour of the consumers. The price now charged is 2s. 2d. below the standard rate fixed by the Company's Act. In their report, the Directors refer, with deep regret, to the death of Mr. R. W. Newton, their former Chairman, who, for the long period of 33 years, had been one of the Directors of the Company.

The profit of the Mirfield Gas Company for the past half year amounts to £2351. The sum available for distribution is £5147; and the Directors recommend that the usual dividends, at the rates of 10 and 7 per cent., be paid, free of income-tax, which will require £2325. The revenue account shows that the total income was £6512; and the expenditure, £4161.

In their annual report, the Directors of the Newcastle and Gateshead Gas Company inform the shareholders that the revenue for 1894 amounted to £221,565; and the expenditure, to £157,709; leaving a balance of £63,856 as profit. The balance of undivided profits from 1893 was £8748; and this, with the profit from last year, makes £72,604. The Directors propose to divide this sum as follows: Inte-

rest on debenture stock, loans, and prepaid stock, £6112; intermediate dividend of £4 17s. 6d. per cent., less income-tax, paid in August last on £600,000 stock, £28,336; to payment of the second half-year's dividend at £4 17s. 6d. per cent. on £615,000, £28,928—making £63,340, and leaving a balance of £9173 to be carried forward. There is an increase in the receipts as compared with the preceding year of £13,092; and an increase in the expenditure of £5230. Extensive alterations made in the scrubbers and other plant, both at Elswick and Redheugh, have considerably augmented the yield of residuals; and the Directors are glad to report that the improved receipts therefrom, together with a better yield of gas, have obviated the necessity of an increase in the price of gas. For the purpose of providing moneys for additions and extensions, the Directors propose to take powers at the annual meeting to issue £6223 of consolidated stock, and £12,500 of 3½ per cent. debenture stock—the balance of stock the Company are authorized to raise and issue under their 1879 Act. The Directors express regret that Mr. Ridley, for many years Manager at the Elswick Gas-Works, died in March last; and they mention the appointment of Mr. Gibb, the Assistant-Manager at Redheugh, to the vacant post. The Directors also refer to the death of their valued colleague, Mr. E. Leadbitter, who was Deputy-Chairman and a Director for many years, and state that they have appointed Mr. W. R. Plummer to fill the vacancy at the Board. During the year, 11¾ miles of pipes have been laid in extensions and renewals, 1522 new branches have been laid, and 2251 old branches renewed; 1043 meters have been repaired, tested, and refixed; 265 ordinary street-lamps have been erected; 40 specially large lamps fitted up for private consumers; and there is an increase of 154 cooking-stoves fixed, making the total number on hire 1983.

The half-yearly general meeting of the Peterborough Gas Company was held last Tuesday, when the Directors reported a sum of £3500 available for distribution. The receipts in the six months ended Dec. 31 last amounted to £9331; the expenditure to £6374—leaving a balance of £2957. A dividend on the preference stock having been provided for, the Directors recommended the payment of the maximum dividends on the remaining share capital of the Company, less income-tax. Under the management of Mr. J. Barton, 4305 tons of coal and cannel were carbonized; the quantity of gas sold being 37,761,100 cubic feet for private consumption, and 4,878,263 cubic feet for public lighting and under contracts. The Chairman (Mr. W. Harris), in moving the adoption of the report and accounts, referred to the successful working results presented therein. Alluding to the effect of the electric light on gas property, he pointed to the rise in the value of The Gaslight and Coke and South Metropolitan Gas Companies' stocks in the past year, and to the remarks of the JOURNAL on this appreciation as showing that the public are becoming satisfied by degrees that gas property is secure. The report was adopted. Confidence was expressed in the Chairman, Directors, and Manager, to whom the thanks of the proprietors were accorded.

According to the accounts presented to the shareholders of the Town and County of Poole Gas and Coke Company, Limited, on the 11th inst., there was a profit of £1231 on the working in the six months ending Dec. 31 last, as compared with £1230 in the corresponding period of 1893—a remarkably close agreement. The receipts were £3673; and the expenditure was £2442. The amount available for distribution was £4197, which enabled the Directors to recommend the payment of the maximum dividends, less income-tax, on the whole of the stocks and shares.

The report to be presented to the shareholders of the Reading Gas Company at their meeting to-day is brief; but in it the Directors express their pleasure in recommending full dividends on all stocks and shares. The amount available for this purpose is £15,895. The receipts in the half year ending Dec. 31 were £27,992; the expenditure being £22,747. There was consequently a balance of £5245 to go to the profit and loss account. With regard to manufacturing operations, the works, under the excellent supervision of Mr. Edward Baker, Assoc.M.Inst.C.E., carbonized 13,720 tons of mixed coal, produced 13,720 chaldrons of coke and 161,201 gallons of tar, and made 139 tons of sulphate of ammonia. The quantity of gas sold for private consumption within the borough was 135,697,000 cubic feet; beyond the borough, 3,722,100 cubic feet; and for public lighting, &c., 9,739,029 cubic feet. The carbonizing branch of the Company's old works has been abandoned, as the additions to the new works which Mr. Baker designed have been completed and brought into use. The additional works, together with the purification department, which has also been added to and improved, are found to be working exceedingly well, and in all respects with the most satisfactory results. The recent floods naturally caused the Directors some anxiety; but they are pleased to report that the new works proved to be high and dry, and therefore the manufacture of gas was not interfered with.

The Chairman of the Scarborough Gas Company (Mr. B. Fowler, J.P.) could not congratulate the shareholders on a large increase in the consumption of gas in the second half of the past year, when moving, at their meeting on the 9th inst., the adoption of the report and accounts for this period, which were noticed in the JOURNAL last week. The cause had, he said, been the mild weather prevailing in the last three months of the year; and, to some extent, the electric light had operated against them. He pointed out that other gas companies had had the same experience. Now, however, that the old-fashioned winter had come in, the gas consumption was highly satisfactory. The revenue account was very encouraging. The receipts were practically the same as in the second half of 1893; but the expenditure was £943 less, owing to the lower price of coal. They had a balance of £7545 to place to the profit and loss account; and they could therefore pay the usual dividends, and carry forward £2393. This might, he said, appear to be a large balance; but he explained that it would, to a great extent, be expended in the renewal of a portion of the carbonizing plant, so as to allow of the adoption of gaseous firing, whereby the Directors expected to realize a great saving. Referring to the position taken up by the Corporation in reference to the Company's Bill, he stated that everything had been settled amicably; and he thought both parties would be satisfied with the arrangements come to. If they could do so, the Directors intended to reduce the charge for gas for the public lighting from 2s. 6d. to 2s. 3d. per 1000 cubic feet at the end of the present contract, which would be something like a rate of ½d. in the pound. If the contract did not run out in June, it was intended to allow 25 per cent. discount to the Corporation so long as the consumption was more than 15 million cubic feet. The report and accounts were adopted; and dividends at the rates of 5, 10, 7½, and 7 per cent. on the various stocks were declared.

In anticipation of the meeting of the Sheffield United Gas Company on the 12th prox., the Directors have issued their report on the working of the undertaking in the half year ending Dec. 31 last. The accounts accompanying them show a satisfactory increase in the quantity of gas sold, and in the revenue from tar and sulphate of ammonia. The total receipts amount to £146,908; the expenditure, to £103,213—leaving a balance of £43,695. The sum available for distribution is £43,323; and the Directors recommend the payment of maximum dividends. This will leave a balance of £5564 to go to the credit of the reserve fund, which will then amount to £85,144; being only £1048 short of the full amount at the present time authorized by the Company's Acts. The quantity of coal and cannel carbonized was 96,661 tons; the residuals being estimated as follows: Coke and breeze, 58,177 tons; tar, 6193 tons; ammoniacal liquor, 3,277,000 gallons.

At the ordinary general meeting of the Wellingborough Gas Company, Limited, next Monday, the Directors will report a steady increase in the business; 7½ per cent. more gas having been sold in the six months ending Dec. 31 last than in the corresponding period of 1893. The receipts for gas amounted to £4634; and the total revenue, to £5723. The expenditure was £3851, of which £2088 was for coals; and the balance carried to the net revenue account is £1872. The sum available for distribution is £2038; and the Directors recommend the usual dividend of 5½ per cent. on the "A" and "B" shares, and of 4 per cent. on the "C" shares, both free of income-tax. A considerable reduction (50 per cent. for most of the sizes) has been made in meter-rents. The quantity of coal used in the half year was 2944 tons. The bulk of gas made was 31,747,500 cubic feet, or at the rate of 10,783 cubic feet per ton, of which 30,794,800 cubic feet, or 10,460 cubic feet per ton, were accounted for, and 30,559,000 cubic feet, or 10,380 cubic feet per ton, were sold. The coke for sale was 9 cwt. 1 qr. 20 lbs. per ton of coal. The tar produced was 31,407 gallons; the ammoniacal liquor, 57,550 gallons—8 tons of sulphate being made. The plant and buildings, under the supervision of Mr. J. T. Lewis, are being efficiently maintained.

The receipts of the Yeadon and Guiseley Gas Company in the six months ending December last amounted to £5225, and the expenditure to £3833; the balance available for dividend being £1392. The Directors recommend the maximum dividends of 10 per cent. on the consolidated stock and 7 per cent. on the new shares.

In moving the adoption of the report, noticed last week, at the recent half-yearly general meeting of the York United Gas Company, the Chairman (Mr. J. F. Taylor) stated that the result of the Company's operations in the six months ending Dec. 31 last had been the unusual one of a deficiency of £1050 in the amount required to meet the dividend. However, the shareholders could afford to draw for the rest upon the surplus profits of previous good years. The Directors had anticipated the result of the great coal strike, and secured such favourable contracts for coal that the profit was largely increased, and they were enabled to give the consumers the benefit in the shape of a reduction of 2d. per 1000 cubic feet in the price of gas; making the scale of charges run from 1s. 10d. to 2s. 1d., according to consumption—a range which few towns in the kingdom could equal. This could only be done by the exercise of watchfulness, care, and economy. As stated in the report, the exceptionally mild bright weather up to the end of the half year had not only checked the consumption of gas for both lighting and warming purposes, but had lessened the demand for coke for domestic fuel. The Directors had, therefore, reduced its price. Sulphate of ammonia, too, had been lowered in value by agricultural depression. It was a matter of regret that the depression which had affected the commerce of this country should have continued so long; but it was to be hoped this "long lane" would soon have a "turning." Mr. W. W. Wilberforce seconded the motion. Captain Lindberg asked if the Directors had ever given any consideration to the question of procuring authority for lighting the city by electricity. Some four years ago, the Corporation obtained powers of this kind. But, up to the present, nothing had been done, and he supposed the matter had lapsed. It would, in his opinion, be greatly to the advantage of the Company if they had similar powers. Alderman Rymer said he could not agree with these remarks. The Company had at present a good concern in the gas undertaking. It was well managed; and he thought the citizens, in view of the reductions that had been made—and even with the previous prices—were very well satisfied. If they began to meddle with the question of electric lighting, there was no knowing where it would end. He thought if the Directors turned their attention to the development of lighting generally—the quality of the gas and burners supplied, and kindred matters—they would not only satisfy the shareholders, but the citizens at large. The Chairman said the Directors were much obliged for the suggestion Captain Lindberg had made; and it should have their consideration. The motion was carried unanimously. The Lord Mayor (Right Hon. W. M'Kay), referring to the remarks of Captain Lindberg, expressed the hope that the Company would not embark upon any such scheme as had been suggested. He trusted the Directors would stick to gas making and the development of lighting as much as was in their power. He proposed a hearty vote of thanks to the Board. The motion having been carried unanimously, the Chairman, in acknowledging the compliment, said they had a good concern, well administered, and in Mr. Charles Sellers they possessed a Secretary worthy of all praise in every respect; so that they need not fear any little temporary disturbance in their affairs that might take place.

Water Companies.

It was reported at the recent meeting of the Chester Water Company that there was a surplus of revenue over expenditure of £2755; and adding the amount brought forward (£5667), made a total of £8423. Deducting the interest on the preference capital £450, left a balance of £7973. It was decided that a portion of this should be appropriated to the payment of a dividend at the rate of 7½ per cent. per annum upon the consolidated stock, and 7 per cent. on the new ordinary stock.

In the course of the proceedings, it was announced that the Directors are carrying out a general improvement of their filtering arrangements at a cost of nearly £600.

The shareholders of the Colne Valley Water Company met at the Charing Cross Hotel last Tuesday to receive the report and accounts for the past half year, a notice of which appeared in the JOURNAL a fortnight since. In moving their adoption, the Chairman (Mr. J. R. Hollond) first called attention to the fact that on this occasion the Directors were proposing to pay ¼ per cent. more dividend. Giving some particulars in regard to the accounts, he said that in water-rates and meter-rents there had been an increase of £432, compared with the corresponding period of 1893. Taking the whole year, the receipts under this head amounted to £14,678, as against £14,097 in the previous twelve months. The shareholders would recollect that during 1893 there was a great drought; and consequently the Company had to lay an exceptionally large number of new supplies. Under the circumstances, the increase in the past year was very satisfactory. The advance in 1894 compared with 1892 was £1814, which made the average for the last two years £907. The new supplies connected during the past six months numbered 149, representing a rental of £314; the figures for the whole year being 274 new supplies, and a rental of £626. To show the steady and continuous increase in the business, he stated that in 1888 the new supplies were estimated to yield a rental of £373; in 1891, £456; and in 1894, £626. The average for the last seven years was £505; so that the past year had exceeded the average. In addition to the new supplies alluded to, the Company had taken over 300 supplies from the Central Middlesex Water Company, which were estimated to bring in about £500 a year; and several additional applications had been received. Regarding the expenditure, the amount paid for rates and taxes had gone very high; but the other expenses—notably fuel—had been less. The total extra expenditure had only been £50. The quantity of water pumped during the half year had been rather more than 184 million gallons, which was, as nearly as possible, a million gallons per day, and a consumption per head of about 20 gallons. The cost of fuel had been at the rate of £2 2s. 9d. per million gallons pumped. As to the increase of the dividend to 4 per cent., the Chairman said the Directors would not have proposed this unless they had been convinced they could maintain it. Respecting the issue of £10,000 of new shares in September last, he mentioned that the total applications reached £67,840, or almost seven times the amount for disposal. Mr. C. E. Keyser seconded the motion, which was unanimously carried. The dividend recommended was then declared; and the retiring Directors and Auditor were re-elected. Subsequently a resolution was passed increasing the salary of the Secretary (Mr. W. Verini) by £50 per annum, until it reaches a maximum of £700 a year. It was stated by the Chairman that, when Mr. Verini's salary was settled at £500 in 1890, the income was £11,000 a year; and at the end of the current year, it would probably be a little above £15,000. The capital had increased from £191,000 to about £227,000.

During the past half year, the East Worcestershire Water Company have connected 287 additional services to their system; making the total 3677, exclusive of Droitwich and Rednal. The extension of the mains for the supply of Stoke Prior has been completed; and a short extension has been made to Tardebigge. With reference to the supply, a second borehole has been sunk to a depth of 336 feet, and tested with a temporary pump; the yield being above 250,000 gallons per day at a depth of 63 feet from the surface, without affecting the supply in the old well. It is expected that the new pumping machinery will be ready before the summer. Respecting the accounts, the profit on the half-year's working has been £1113; making with the amount brought forward £1689. This it is proposed to carry forward.

Upon the profit and loss account of the South Hants Water Company for 1894 is an available sum for division of £5028, from which it is proposed to pay dividends at the rate of 8 and 5⅝ per cent. respectively on the ordinary and new ordinary shares for the past six months. These, with the interim dividend at the rate of 5 and 3½ per cent., will absorb £4136. The net increase in the year's rentals was £607; and in the twelve months 484 houses were added to the rent-roll. A new reservoir at Michelmersh is nearly completed, and will be ready for use early in the spring. A site for a reservoir at Bitterne has also been secured; and its construction will be commenced shortly.

At the half-yearly general meeting of the South Staffordshire Water-Works Company to be held on the 28th inst., the Directors will report that the amount for distribution is £20,596; and they will recommend a dividend for the six months ending Dec. 31 last at the rate of 5½ per cent. per annum, less income-tax, on the ordinary stock. This will amount to £15,817; and there will consequently be a balance of £4779 remaining to the credit of the current half-year. The number of houses connected in the period covered by the report was 1962; making the total supplies 85,294. The gross amount of water-rates was £43,492, compared with £42,000 in the second half of 1893. The Directors have transferred a further sum of £1000 to the depreciation fund, which now stands at £8813. The Company having lost by death the services of their Engineer, Mr. W. Vawdrey (to whose widow they recommend a grant of £500), the usual report on the condition of the works and plant, which is a satisfactory one, is made by Mr. A. E. Douglas, the Assistant-Engineer.

The Stockport Water Company have decided to pay a dividend at the rate of 6¼ per cent. per annum, to raise £5000 additional capital by the issue of new stock, and to borrow £4000 to meet the cost of new plant, including a well at Wilmslow. The Company are at present receiving a million gallons of water per day from Manchester.

The report of the Woking Water and Gas Company for the half year ended Dec. 31 last, which will be presented to the shareholders on the 26th inst., states that the total revenue for the year was £5782; the expenses on revenue account being £2533. Owing to the drought in 1893, the Company were put to extra expense for labour, maintenance, repairs, &c. The balance carried to profit and loss account is £3249. The balance available for distribution is £1566, out of which the Directors recommend a dividend at the rate of 4 per cent. per annum for the past half year, tax free; and a balance of £49 will be carried forward. The new engines and pumps erected at West Horsley are in use, and are acting satisfactorily. The Engineers (Messrs. J. Quick and Son, MM.Inst.C.E.) report the works to be in good order.

The Yeadon Water Company during the past six months received a total of £1254; and they have a disposable balance of £622. Dividends at the rates per annum of £3 10s. and £2 9s. per cent. respectively on the original and "B" stock are recommended by the Directors.

THE SCARBOROUGH CORPORATION AND THE GAS COMPANY.

The Company's Bill—Proposed Purchase of the Works.

In the report of the meeting of the Scarborough Gas Company which appears, under the heading of "Provincial Gas and Water Companies," in another column, reference is made to the position taken up by the Corporation in regard to the Bill promoted by the Company to obtain further capital and other powers, as noticed in the JOURNAL for the 15th ult. (p. 117). The Town Clerk (Mr. J. E. T. Graham) received instructions from the Parliamentary Bills Sub-Committee of the General Purposes Committee of the Corporation to retain Mr. Corbet Woodall, M.Inst.C.E., to advise them; and he was also directed to forward to the Board of the Company a statement of the amendments they desired to have made in the Bill. One of these was that Directors and an Auditor should be appointed by the Corporation; and a further proposal was made for the purchase of the Company's undertaking. Neither of these were the Directors prepared to entertain; but they expressed their willingness to arrange a conference in a friendly spirit on the other amendments. The Sub-Committee said they would be prepared to meet the Directors in conference, but could not withdraw any of the proposed amendments. The conference took place on the 2nd inst.; Mr. Woodall being present as representing the Corporation, and Mr. J. Hepworth, M.Inst.C.E., on behalf of the Company. The proposed amendments were gone through, and certain terms agreed to, which the Sub-Committee recommended for adoption. They also expressed the opinion that the time was now suitable for taking into consideration the purchase of the Company's property, if a reasonable price could be agreed upon. Progress thus far was reported to the General Purposes Committee of the Corporation, who approved of the minutes of the Sub-Committee, and resolved (*inter alia*) to request Mr. Woodall and the Borough Accountant to report to them on the advisability of the purchase by the Corporation of the gas undertaking. When these reports are received, they are to be referred to a Committee consisting of all the members of the Finance Committee and the Parliamentary Bills Sub-Committee.

At the Meeting of the Town Council on Monday last week—the MAYOR (Alderman V. Fowler) in the chair—the matters above referred to came before the members in the minutes presented by the General Purposes Committee.

Mr. J. H. MOODY, in moving the confirmation of the minutes, remarked upon the negotiations which had been in progress with the Gas Company in regard to their Bill, and expressed satisfaction that both parties had practically come to an amicable settlement. A deputation would shortly proceed to London to meet the Directors of the Company on certain points; and he hoped things would so far be settled that the Bill should pass through Committee as an unopposed measure. There was no doubt it would be beneficial to the town.

Mr. E. R. CROSS, the Chairman of the Parliamentary Bills Sub-Committee, in seconding the motion, stated that they had gone through every clause of the Company's Bill, and had examined carefully all the important Gas Bills which had been passed during the last three or four years, in order to secure for the consumers of gas in Scarborough all the protection which other corporations had obtained for their constituents. They had also examined the Company's accounts for the last 20 years. On the technical matters involved in the Bill, they had had the advantage of the advice of the most eminent expert in England—he thought he might say in Europe—Mr. Corbet Woodall; and his extensive experience had been of the greatest service to the Sub-Committee. The result of their labours had been to arrive at an arrangement by which the Bill would not be opposed, and by which, he thought, every substantial clause that could have been obtained before a Parliamentary Committee for the protection of the consumers had been inserted in the Bill; and the consumers of gas and the ratepayers of the borough were being saved an expense on that most wasteful form of litigation—a contest before a Parliamentary Committee. That result had been arrived at very largely by the good sense and reasonableness of the Directors of the Gas Company; and it was only just to pay a tribute to the open-minded and fair manner in which they had approached the consideration of the suggestions made by the Corporation. The principal clause of the Bill proposed to authorize the Company to issue additional capital to the extent of £79,000. It was a matter of common knowledge that the present capital was very heavy—£150,000 share, and £35,000 loan. One interest on this absorbed 1s. 0½d. per 1000 cubic feet of gas sold. The Company, it was perfectly clear, were entitled to have some addition to their capital. The undertaking had been growing in the last 20 years by leaps and bounds; the consumption of gas during that time had trebled, and there seemed no likelihood of any decrease. Although they recognized that the Company were entitled to some increase in their capital, the Corporation were resolved to make it as little as possible, so that they would have to go to Westminster more frequently. They were advised that Parliament would only grant power to raise capital sufficient for 14 years; and therefore they asked the Company to limit the capital to that which they would reasonably require for this period. The Company accepted this provision; and the requisite amount was to be fixed by their two engineers. He thought he might say that the result would be a reduction of the capital to be authorized by about one-fourth. The stock proposed to be raised was put at 7 per cent. interest. The Corporation asked that it should be lowered to 5 per cent.; and to this the Company had agreed. They had secured in

this part of the Bill the insertion of a most important clause, and one which was entirely novel in Gas Bills. It provided that, in the event of the purchase of the undertaking at any time by the Corporation, the new stock issued under the powers of the Bill should be redeemed at the price at which it was issued. This clause was one which was perfectly fair in the interest of the shareholders, and also to those who would purchase the new stock, because they would have fair notice of it, and the transferee would also have fair notice of it on his certificate. The effect of the clause was to secure to the Corporation, if they ever purchased the gas-works, the unearned increment of the new stock. The next alteration was one dealing with the application of the premiums. The clause, as originally drawn, provided that the premiums should be applied to improving and extending the works and paying off mortgages. The Corporation did not want the Company to pay off mortgages. It was to the advantage of the consumer that they should exercise their borrowing powers as much as possible. Therefore they were asked to strike out the words as to paying off mortgages; and they had agreed to do this. Then the Corporation asked them to agree to an increase of their borrowing powers from one-fourth to one-third of the new capital; and this had been agreed to. The next important point where they secured an alteration was that which dealt with the conversion of loan into share capital. Under the existing law, gas companies might, instead of raising on mortgage the money they were authorized to borrow, issue stock; and they could also convert their loan capital into share capital. This would be objectionable; and the Corporation had succeeded in inserting a clause preventing this from ever taking place. He did not think for a moment that the present Board of Directors were likely to do anything of the kind; but it was rather a mischievous power, and one which should, he thought, be taken away. In future, all money to be raised would have to be publicly tendered for. This would secure that the new loan capital would be obtained at the lowest possible rate. It was only right he should point out that the Company had acted very fairly during the last few years as regarded this matter. He hoped they would be able to raise the whole of the new loan capital at 3 per cent. Another clause authorized the Company to carry over year by year any balance that remained after paying the maximum dividend and filling up the reserve fund. This had been struck out; and the Corporation had succeeded in inserting a clause enabling them to take proceedings for obtaining a reduction in the price of gas. Passing on to deal with the consolidation clauses, Mr. Cross said they authorized the Company to consolidate the whole of their stock—some of which was 10 per cent., some 7½ and 7 per cent.—into new stock, bearing a uniform maximum dividend of 5 per cent. The effect of this clause would be that, although it would not alter the maximum dividend, it would add largely to the nominal capital of the undertaking. This would not of itself affect its value; but seeing that a 5 per cent. stock was always more valuable in proportion than one bearing a higher dividend, it would operate prejudicially to the Corporation in the event of purchase. At first, therefore, they objected to the clause on principle; but they knew they would not be able to sustain the objection, seeing that the proposal was convenient to the shareholders, and also for the benefit of the consumers if the Corporation never purchased. For it was obvious that anything which increased the market value of the present capital increased the ease with which the Company could borrow and raise fresh capital. They had, therefore, withdrawn their objection to the principle of the clause, but had stipulated with the Company that the scheme of consolidation should be set out in the Bill, and be subject to the approval of the Sub-Committee. As to the price of gas, under the Company's Act of 1867, the maximum figure charged to private consumers in the borough was 5s. per 1000 cubic feet. It was proposed that the limit in the Bill should be 4s. They had had some negotiations on this point, and had brought it down to 3s. 6d. With regard to the public lighting, they had succeeded in gaining, so far as the Corporation were concerned, a most important concession. The Company had agreed that in future the actual price charged for gas for this purpose should not exceed three-fourths of the gross sum charged to private consumers, so long as the Corporation consumption was upwards of 15 million cubic feet, nor four-fifths so long as it was more than 10 million cubic feet. This agreement would bring about an immediate lowering of the charge made for public lighting from 2s. 6d. to 2s. 3d.—a reduction of 10 per cent. The effect of this clause would be to compel the Electric Light Company, if they wished to light the streets, to quote a very low figure; and there could be no objection to that. The saving the new arrangement would bring about would be £250 a year. Mr. Cross next dealt with the portion of the Bill relating to the new works proposed to be carried out, and mentioned the points on which an agreement had been come to with the Company. As to the suggested representation of the Corporation on the directorate, this proposal seemed, he said, to be rather seriously objected to by the Directors, though he could not understand the reason why. He thought the arrangement combined the benefits of municipal management with private enterprise; and he hoped and believed that before long it might be an invariable feature in Gas Bills. Though at present it might seem revolutionary, there was a Bill, which would come before Parliament this session, promoted by one of the largest and best-managed Gas Companies in the Metropolis—the South Metropolitan Gas Company—by which it was originally proposed to authorize the representation of the Company's employees on the Board. This was even a more revolutionary proposal than the one the Corporation had put forward. Another clause proposed by the Corporation, to which the Company objected, was that suggesting the appointment of one of the Company's Auditors by the Corporation. The Directors, however, met them fairly by agreeing to the employment of a chartered accountant to audit the accounts. This was a reasonable compromise which the Sub-Committee felt they ought to accept. Then he came to the clauses relative to the illuminating power of gas. At present the minimum was fixed at 14 candles; and the Company had agreed to a clause raising the standard to 16 candles. Referring to the purchase question, Mr. Cross said they had obtained a clause empowering the Corporation to purchase the Company's undertaking any time during the next three years at a price, failing agreement, to be fixed by arbitration under the Lands Clauses Consolidation Act. They had also obtained one suspending the issuing of practically the whole of the new capital for a twelvemonth, in order that the question of purchase might be thoroughly gone into; so that, if the Corporation decided to buy, they would be able to promote a Bill next session. The power of raising capital, except to a small extent, would therefore be suspended until that time. The Corporation were perfectly alive to their responsibility in this matter; but the question was not so simple nor so easy as some people imagined. As an abstract proposition, there was no doubt they would all agree that undertakings connected with gas, water, electricity, and tramways should be in the hands of corporations. The difficulty was not about the principle, but the price. If they were to give the same number of years' purchase that had been paid by many municipalities, it would mean for several years to come a deficit on the revenue account, which would have to be met either by raising the rates or increasing the price of gas. He did not think the town would stand that. Therefore, speaking for himself, he would not be prepared to vote for the purchase of the gas undertaking unless it could be shown, by the best engineers' advice, that the maximum number of years' purchase which an arbitrator would award would not involve them in a very serious increase in the charge for gas or in their rates. They would have an opportunity of considering this question very carefully. But they would not incur any reckless expense merely because sentiment said gas-works ought to be in the hands of the Corporation. Some of the points to which he had alluded would be gone into in London; and he trusted the result of the meeting would be satisfactory. In looking at the negotiations which had already taken place, he did not think either side could claim to have scored a victory. There had been "give and take" on both sides; and he regarded the arrangements come to as fair and reasonable, and in every way creditable to both sides. The Directors might rest perfectly satisfied that they had surrendered nothing which would injure an undertaking of the past prosperity of which they had every reason to be proud; and he thought he might claim that the Sub-Committee, in dealing with the matter to the best of their ability, had not allowed the interests of the town to suffer in their hands.

Mr. PIRIE said he appeared in a sort of dual capacity—as a shareholder in the Gas Company and as a member of the Corporation; and he should like to bear his testimony to the great ability with which Mr. Cross had carried through this important matter. Mr. Cross might have said, when referring to the allotting of stock among the present shareholders, that there was cause for it. For years before the last Bill was passed, the shareholders had not received their full dividend; and therefore it was only fair that the new stock should be allotted among them. He was sure the Corporation might rest satisfied that they had the best of the bargain. However, a good Gas Bill for the town was a good one for the Company. With regard to the South Metropolitan Company's proposed "labour director," it was only fair to point out that the employees had a large amount of stock invested in that Company, and it was only natural they should wish to be represented on the Board.

The minutes were confirmed.

Prepayment Meters at Widnes.—The Widnes Corporation Gas and Water Committee reported to the Town Council last Tuesday that 1250 forms for the supply of gas under the prepayment system had been applied for; 841 applications had been filed; and 373 houses had been already fitted.

Hydraulic Power Supply.—The report of the Directors of the General Hydraulic Power Company, Limited, made up to Dec. 31, 1894, states that the gross receipts for power during the year were £57,780, as against £51,445 in 1893. After providing for interest on debentures, Directors' and Auditors' fees, and £4200 for depreciation, the balance is £30,873, including £1141 brought forward from the previous account. The Directors propose to pay a dividend at the rate of 6¼ per cent. for the year, on account of which an interim dividend of 2¼ per cent. was paid in August, making the distribution for the six months to Dec. 31 3¾ per cent. The balance to be carried forward will be £1406.

The Arrol-Foulis Retort-House Plant at Beckton.—The Gaslight and Coke Company, having last year decided to adopt some system of mechanical stoking at their new house at the Beckton works, instructed Sir W. Arrol and Co., of Glasgow, to fit up a complete installation of the Arrol-Foulis plant, consisting of four charging and four drawing machines, coal breakers, elevators, and the necessary hydraulic machinery. This plant has now been in regular work for some time, and, we are glad to learn, is giving complete satisfaction. It is a very important installation, since it embodies all the latest improvements adopted by the makers. Only one man is required for working either the drawing or the charging machines, as hydraulic motors are now attached to the latter, by which they are travelled along the house. These motors, which are so constructed that they use a minimum quantity of water, are, we understand, working very well; the man in charge having no difficulty in stopping his machine immediately opposite the mouth of the retort.

The Little Don Water Schemes.—A meeting of owners and ratepayers of Sheffield, held last Wednesday, passed a resolution consenting to the "opposition by the Corporation in Parliament of local and personal Bills which may be promoted by the Corporation of Barnsley, the Dewsbury and Heckmondwike Water-Works Board, and the Corporation of Rotherham, or any of them, in the present session of Parliament, in pursuance of notices given by them respectively, for (among other things) obtaining powers to take water from the River Porter or Little Don, or tributaries thereof, and execute the necessary works for the purpose of supplying the various districts of the said Corporations and Water-Works Board with water from such river or its tributaries." During the proceedings, Alderman Gainsford, the Chairman of the Water Committee, stated that so far as Sheffield was concerned, they were acting in the matter purely on the defensive. The water of the Little Don Valley was claimed as necessary for Sheffield as far back as 1869; and in the year 1874 it was not only further claimed, but was tolerably well proved to the satisfaction of the Committees of the Houses of Parliament, that the water was necessary, and ought to be reserved, for the people of Sheffield.

WALSALL CORPORATION GAS SUPPLY.

Annual Financial Report—The Allocation of the Profits—Reduction in Price and Discount on Accounts.

At the Quarterly Meeting of the Walsall Town Council yesterday week, the Borough Auditor (Mr. G. R. Ridsdale) reported that the profit of the Gas Department for the past year came to £9285—an increase of £7370 as compared with 1893. The gas sold to private consumers during the past quarter amounted to £12,577; being an increase of £1029, in comparison with the corresponding quarter of the previous year. The Gas Committee stated that the increased receipts were due to the following causes: The reduced cost of coal, which was £3872 less than in 1893; the extra charge of 2d. per 1000 cubic feet which was imposed during the coal strike, and which had yielded about £2000; the improvements and saving effected by the recent extensions at the Pleck works; and the strict economy which had been exercised in every department of the works. The Committee thought the Council were to be congratulated that, in a time of depressed trade, the undertaking had produced such good results (the best since 1883), which would not only enable them to transfer to the credit of the borough fund the sum of £5000, which had been included in the last two estimates, but to carry a substantial sum forward. This sum the Committee proposed to transfer to the credit of the reserve fund, which stood at only £5237, although the capital invested in the concern was £188,672. The Committee also recommended a reduction in the price of gas to 2s. 6d. per 1000 cubic feet as from Jan. 1 last, and the allowance of a discount of 2½ per cent. (to come into operation in the June accounts) on all accounts paid at the gas office within one month of delivery. This discount, they considered, would cause the accounts to be paid more promptly than heretofore, and save a substantial sum for interest, by rendering unnecessary, to a great extent, the present large overdraft on the gas account. The reduction in price would amount to about £2000, and the discount to £750; making together £2750. The Committee anticipated that, after making these deductions, the net profit for the current year would again leave £5000 available for the borough rate.

The report having been adopted,

Mr. COPE, in proposing the adoption of the recommendation as to the allocation of the profits, said the gas-works had been called a "milch cow;" and it was evident the "milch cow" was not dead. He did not anticipate that in future years the saving in the cost of repairs would be as large as it had been in the past year; and he considered the proposal to transfer the surplus to the reserve fund was sound finance. Their Act gave them power to carry £1000 a year to reserve, and to lay by £10,000 in ten years. But more than ten years had passed since then; and their reserve stood only at £5237.

Mr. HUGHES disagreed with Mr. Cope that it was sound finance to carry such a sum as £4285 to the reserve fund in one year. He proposed that only £2000 be allocated to that fund.

The TOWN CLERK desired to be allowed to say that the Chairman of the Gas Committee, who was unable to be present, had asked him to state the reasons which had induced the Committee to adopt the recommendation which they had forwarded to the Council. The profit this year was entirely exceptional. It was largely due to the fact that the Council had been dismantling the Wolverhampton Street gas-works, and that, in consequence, there had not been the usual expenditure upon repairs. This represented a gain of £1600, which they could never get again. Then, in addition, they were going to reduce the price of gas, which was equal to £2000; and the discount was equivalent to a further £750. All these sums represented exceptional profits. The Act of 1876 gave them power to build up a reserve fund of £10,000 in ten years, and to increase the fund to £20,000 in another ten years. These powers had not been exercised, however, because there came a bad time; and year by year the profits had been carried to the borough fund for the benefit of the ratepayers. Then there was the strike; and they had no reserve fund to fall back upon, and were obliged to increase the price of gas. Under all these circumstances, he was satisfied they were consulting the best interests of the concern and the ratepayers in strengthening the reserve fund. They were about to increase the liabilities of the gas-works to £250,000; and supposing electricity were introduced, how would that liability be met? It could only be by increasing the rates, because, with electricity in the field, they would not be able to increase the price of gas; and to increase the rates would be to increase the rent of every house in the borough.

Mr. CLARE seconded the proposition, though desiring that the consumers should have gas at cost price, which he believed would be about 1s. 11d. per 1000 cubic feet. It was unfair to people who burnt gas to pay the rates for those who were not consumers.

The TOWN CLERK, in answer to Alderman Holden, said the ratepayers did not receive a penny for interest on the capital invested in the gas-works.

Alderman HOLDEN: That represents £6000; you should be honest.

The TOWN CLERK added that the Borough Auditor said the works ought to earn £10,000 for the ratepayers. In answer to a further question, he said there were about 6000 houses in the borough in which gas was not consumed; but the Committee had under consideration a scheme to popularize the use of gas in small houses.

The Committee's recommendation was approved.

The Dublin Corporation Bill.—A meeting has been held of deputations from the Boards of the various suburban townships of Dublin "injuriously" affected by the water clauses of the Corporation Bill. It was considered that the Bill ought to be strenuously opposed; and a resolution was passed to the effect that the best means of doing this was by supporting an alternative scheme of water supply.

Water Gas for Middlesbrough.—Mr. David Terrace, the Engineer of the Middlesbrough Corporation Gas-Works, has reported to the Gas Committee that he has made a preliminary investigation in reference to the manufacture of carburetted water gas, and finds that, if the present inclined-retort house were extended, it would be suitable for any system of gas making. A report on the manufacture of carburetted water gas is being prepared by Mr. Terrace.

ELECTRIC LIGHTING NOTES.

The area of Folkestone proposed to be lighted under Mr. D. Baker's scheme has been inspected by Mr. Medhurst, the electrician consulted by the Corporation Electric Lighting Committee; and he has submitted a report. He estimates the cost of the works he proposes at £19,000, inclusive of a dust-destructor, by means of which a saving of from £300 to £400 a year would be effected for the borough.

The business of the Newcastle and District Electric Light Company continues to expand; and yet the Gas Company (as will be seen by their report in another column) are more prosperous than ever. The electric lighting installations connected during the past year were equal to 3000 10-candle power lamps; bringing up the total to about 21,500. The gross earnings amounted to £3792. At the meeting of the shareholders yesterday week, it was decided to pay a dividend of 3½ per cent. for last half year; making 6 per cent. for the twelve months. A resolution was also passed, empowering the Directors to increase the capital from £50,000 to £100,000.

In the course of his address to the shareholders the recent meeting of the Liverpool Electric Supply Company, the Chairman (Mr. A. H. Holme) stated that, during the past three years, the increase in the number of lamps connected to their system had been equal to 25 per cent. per annum. The total number of lights supplied by the Company was 31,792. At the time they started, the charge was 1s. per unit; and this had been reduced to 7½d. With double the number of lights they now had, he felt confident the price could be reduced to something like 5d. He briefly alluded to the negotiations with the Corporation for the acquisition of the works; but, of course, he would not at this stage give any particulars. A dividend at the rate of 6 per cent. was declared.

When a Corporation confesses to a probable loss of £3500 in a year over an electric lighting speculation, it is time that the ratepayers began to look into the matter; and therefore Mr. W. J. Trounce was quite justified, when the minutes of the Electric Lighting Committee were under consideration at the meeting of the Cardiff Town Council on the 11th inst., in asking what was being done. He pointed out that, in Bradford and other towns, the works were carried on at a profit even during the first year of their installation. Mr. H. White stated that the contractors were asking for time; and that the machinery was practically "thumping itself to pieces." They themselves were not competent to deal with it, as it had not been properly passed. The Mayor (Alderman Carey, J.P.) said he must join issue with Mr. White when he said that the machinery was "thumping itself to pieces." They had, unfortunately, at present only "half a load" on it; but when they had a full load, he was assured the vibration would subside. He went on to say that, on this point, there seemed to be a disagreement between the officials. He was informed by one person one thing, and by another something else. At present they had no one in authority. It was too much to ask the Borough Engineer to take charge of the works. With regard to the electric light station, they required a man in full authority, who would confer with the Borough Engineer on any critical point. From what subsequently transpired, there seemed to be a proposal on foot to place in charge of the station the gentleman who has the supervision of the works for the contractor; but this matter was referred back, and the Borough Engineer and Mr. Massey are to report on the position of affairs. In the course of further discussion, the Mayor stated that they had not yet taken over the machinery, which the contractors said would be ready in a few weeks; and until they had it in their own hands, they could not do anything. The electric lighting scheme was somewhat slightingly referred to at a recent meeting of the Public Works Sub-Committee of the Corporation, when they were examining some very fine plans submitted to them on behalf of the Gas Company, who are re-erecting offices on their present site. A remark was made that the Directors of the Company did not seem to be affrighted by the introduction of electricity. Whereupon the Chairman (Alderman Lewis) replied: "I think the best thing we can do is to sell the electric plant altogether, if we can get anybody to bid for it."

The Wakefield City Council last Wednesday resolved to apply for powers to expend £20,000 in carrying out the first instalment of the proposed electric lighting works.

At the last monthly meeting of the Hastings Town Council, the bill of the Electric Light Company for the lighting of the sea-front was under consideration; and suggestions were made that it should be reduced, on the ground of the frequent failure of the light. It was accordingly referred back to the Finance Committee with this object. Referring to the matter, a local paper says: "It is notorious that the sea parades have often been left in a state of gloom, forcibly recalling the boyish conundrum about Moses and the candles. Complaints have been frequently made to us about the annoyance produced by the vagaries of the electric lamps. Neither the Corporation nor the ratepayers desire to press harshly upon the Electric Light Company, which has had a long and an uphill fight. But in this matter the public comfort and convenience stand first; and if the electric lights fail to furnish the illumination they were put to supply, the Directors must not expect the terms of the contract to be carried out by one side only. The old 'Whitehall' [gas] lamps, in our opinion, gave really a better light. But electric street lighting is one of the 'fads' of the period; and we must go with the fashion. We need not, however, pay more than our fair share of the lighting bill."

THE YORK WATER COMPANY'S BILL.

The Demands of the Corporation.

An Adjourned Special Meeting of the York City Council was held last Thursday, to further consider the provisions of the York Water Company's Bill, which the Council had already resolved to oppose.

Alderman CLAYTON, the Chairman of the Water Committee, said that proposals for agreement with the Company had been submitted to the Directors, with whom the Committee had had a conference. As a result, the Corporation and the Company were at issue with regard to the following matters: The Company offered from

Jan. 1, 1896, to supply water to the public baths at 3d. per 1000 gallons, and to provide to the extent of £60 a gratuitous supply of water to the public baths when they were free. The Corporation asked that the limitation of £60 per year be withdrawn. The Company offered to agree that they should have the same liability, and the Corporation the same rights, with respect to fire-hydrants as they now respectively had with regard to fire-plugs; but they made a condition that the cost of substituting fire-hydrants for existing fire-plugs be borne by the Corporation. The Corporation asked that the Company would replace fire-plugs with fire-hydrants. The Corporation also desired the Company to reduce all charges for water by 10 per cent., and that in the case of water-closets in houses the rental of which did not exceed £15 per annum, the charge should not exceed 3s. To this the Company had replied that, as from Jan. 1, 1897, they were willing to make the following reductions: 5 per cent. on water supplied for domestic purposes and by meter for trade purposes, but not upon the charges made for baths and water-closets. The remaining differences arose upon the financial clauses; the only part of any of these provisions which the Company agreed to accept being a limitation of the reserve fund to £10,000. In view of the above, the Committee had that afternoon agreed to recommend the Council to proceed with the opposition to the Bill unless its requirements were conceded. Even if they came to an agreement with the Company, it would nevertheless be desirable to petition against the Bill, in order for them to secure *locus standi*, and so be in a position to proceed if any hitch occurred in connection with the embodiment in the Bill of the terms of agreement. He, therefore, moved the adoption of the recommendation of the Committee that, unless the terms asked for by the Corporation were conceded, they proceed to oppose the Bill. The concessions which the Company were prepared to make would represent a saving to the ratepayers of £1151 per annum.

Mr. ANDERSON seconded the motion.

Alderman WRAGGE moved an amendment that, provided the Company were willing to give 5 per cent. concession on the whole of their receipts, in addition to the other concessions agreed upon, the Council would withdraw their active opposition to the Bill. He remarked that the purchase of the undertaking would involve an expenditure of some £400,000, and that, if they had less than 60 years in which to pay this off, there would be an annual burden on the city. There were various reasons in his opinion why they would not be allowed 60 years in which to repay the money. As against that, the Directors were prepared to meet them in a most reasonable way, by making concessions which were equal to 1¼d. in their present rates.

After some discussion, the amendment was lost by 14 votes to 15; and the resolution was carried by a majority of one.

A Water Scheme for Upton-on-Severn.—A Local Government Board inquiry has been held by Mr. Arnold Taylor at Malvern Wells respecting an application by the Upton-on-Severn Rural District Council for a Provisional Order, to give compulsory powers to acquire land for a water-supply scheme, the total cost of which is estimated at £3500. The Great Western Railway Company appeared in opposition, on the ground that the works would interfere with their supply of water from the railway tunnel through the Malvern Hills.

Nelson Corporation Water Department.—Mr. Astley, the Chairman of the Nelson Corporation Water Committee, made a statement in regard to their affairs at the last meeting of the Council. He said the Committee were in a very favourable position for meeting a dry summer. When they recently set to work to discover the sources of the large loss of water in the town, the leakage amounted to 364,000 gallons per day; and now they had brought it down to 228,000 gallons. The water charges had been revised; and the management had been thoroughly investigated, and a lot of anomalies had been put right. The new scale of charges compared favourably with many other towns, and would produce additional revenue from the department, which last year only yielded £400. He also intimated that it would not be very long before the Corporation would have to spend £30,000 or £40,000 more upon reservoirs, in view of the rapid growth of the town.

Lecture on the Oldham Corporation Water-Works.—Mr. Adam Lee, the Chairman of the Oldham Corporation Water Committee, has lately delivered a lecture, at the Central Free Library of that town, on a subject of much interest to the ratepayers—viz., the Corporation water-works. He devoted the first portion to an historical account of the various water schemes from their inception down to the present time. The agitation for a water supply commenced in 1823; and in 1825 a Gas and Water Act was passed, which, among other things, empowered the Company formed to construct the Upper Strinesdale reservoir. Extended powers were obtained in 1838; and in 1843, the construction of an additional reservoir was taken in hand. In 1852, the Town Council agreed to purchase the gas and water works at a guaranteed perpetual dividend of £1 on each share, payable half yearly. The Act of Parliament to carry into effect the agreement was passed the following year. In 1855, the Corporation obtained parliamentary sanction to the construction of the Piethorn, Kitcliff, Brushes Clough, and Besom Hill reservoirs, and a conduit to Strinesdale; and, owing to the unprecedented growth of the town, the Corporation had to apply again in 1870, for powers to carry out what was known as the Denshaw scheme, including the Ogden reservoir for compensation. The 1870 Act was amended in 1875; and the storage was practically doubled by providing larger, though fewer, reservoirs. The demand had once more overtaken the supply in 1885; and the Corporation secured powers to build Castleshaw and Rooden reservoirs. The total cost of the works to March, 1894, was £1,039,840; and there had been paid off and in hand £289,568. Mr. Lee also mentioned that Oldham had an interest in the Manchester Thirlmere scheme; for when every other available source had been exhausted, Oldham could then claim a supply from the Thirlmere works. This, of course, he said, must be the very last resource, as it would become a perpetual charge, and would cost about double that of any of the other sources of supply, which, in a given number of years, would be paid off, and become the absolute property of the town.

THE LONDON COUNTY COUNCIL AND THE METROPOLITAN WATER QUESTION.

Proposed Scheme of Supply.

At the Meeting of the London County Council on Tuesday last—Sir J. HUTTON in the chair—a report was presented from the Water Committee, recommending the Council to pass resolutions declaring that the scheme for a system of storage reservoirs presented to the recent Royal Commission was not the proper method of meeting the future wants of London, and that the true solution of the problem was the obtaining of the necessary additional supplies from a purer source. The report dealt with the question at considerable length; but the following are the principal portions of the document.

The Committee begin by referring to their previous reports on the water question, especially to the one in which the report of the Royal Commission on the Water Supply of the Metropolis was fully considered, in accordance with their instructions, by the Chief Engineer, the Parliamentary Agent, the Medical Officer, and the Chemist of the Council. This collection of documents was noticed in the JOURNAL for March 6 last (p. 442). In view of their importance, the Committee have ordered them to be again sent to the members of the Council. Brief allusion is then made to the conference held on the 30th of July last with representatives of various sanitary authorities outside the limits of the Administrative County of London, but within the parliamentary areas of the Water Companies. At this conference, it may be remembered, the policy of the Council with respect to the water supply was discussed, with special reference to the best arrangements that might be made for the subsequent supply of outside areas; but the parties failed to arrive at a definite understanding on the matter. The Committee then proceed to deal with the report of the Royal Commission as follows:—

We acknowledge the great importance to London of the evidence collected by the Royal Commission. But we do not consider that the main suggestions of the report are likely to afford a final and satisfactory settlement of the London Water Question; and we propose to state some of the reasons which lead us to this conclusion.

The reports and memorandum already mentioned call attention to the limited nature of the reference to the Royal Commission. They were to inquire "Whether, taking into consideration the growth of the population of the Metropolis and the districts within the limits of the Metropolitan Water Companies, and also the needs of the localities not supplied by any Metropolitan Company, but within the watersheds of the Thames and the Lea, the present sources of supply of these Companies are adequate in quantity and quality; and, if inadequate, whether such supply as may be required can be obtained within the watersheds referred to, having due regard to the claims of the districts outside the Metropolis but within those watersheds, or will have to be obtained outside the watersheds of the Thames and the Lea." Those terms of reference practically limited the Commissioners to the question whether further utilization of the present sources formed a possible solution of the difficulty, and precluded them from going on to inquire whether this was the best possible solution.

The Commission could not, and did not, inquire (1) whether a supply could be obtained outside the present source which would be (*a*) better in quality than the present supply, and (*b*) more likely to remain free from deterioration in future; nor (2) whether such supply would be more ample in quantity than any that the present source could afford, and so capable of sufficing for a longer period of years; nor (3) as to the relative cost of the two sources; nor (4) as to the possible sources outside, and the probability of their being occupied by other towns if London delayed. The terms of reference, therefore, excluded the vital question whether, having regard to the whole of these important considerations, it would be wiser to adhere to, and develop, the existing sources or to go outside, or to adopt to some extent a combination of the two methods of supply.

The subject of the reference was of such magnitude that it was possibly well that the inquiry should have been limited as indicated; and those who framed the reference to the Commission no doubt had in view that it would rest with the people of London or their elected representatives to decide, having regard to the facts elicited by the Commission, what course should be ultimately taken.

On the most important subject referred to the Royal Commission—namely, the quality of the water at present supplied to London—the report of the Commission appears to us somewhat inconsistent. Paragraph 178 is as follows: "We are strongly of opinion that the water, as supplied to the consumer in London, is of a very high standard of excellence and of purity, and that it is suitable in quality for all household purposes. We are well aware that a certain prejudice exists against the use of drinking water derived from the Thames and Lea, because these rivers are liable to pollution, however perfect the subsequent purification, either by natural or artificial means, may be. But, having regard to the experience of London during the last thirty years, and to the evidence given to us on the subject, we do not believe that any danger exists of the spread of disease by the use of this water, provided that there is adequate storage, and that the water is efficiently filtered before delivery to the consumers." It will be at once observed that, notwithstanding the approval of the quality of the water expressed in the first sentence, the last phrase points to a danger of the spread of disease which might exist by the use of this water, if there were not adequate storage and efficient filtration before delivery to the consumers.

In an earlier paragraph (172), the Commissioners find as a fact "there can be no possible doubt that at the present time much filth of various kinds is discharged unnecessarily and illegally into the rivers. . . . Where sewage works in the valleys of the Thames and Lea have been constructed on an efficient system, the sewage can be so effectually dealt with at all times, except those of flood, that the effluents are clear and innocuous." Here it seems to be implied that in times of flood the effluents would be neither clear nor innocuous, and that at other times the effluents are clear and innocuous only where the works have been constructed on an efficient system. "We are aware that all

sewage farms and sewage works are liable, through carelessness or accident, to do their work at times with less than proper efficiency." Various causes of pollution, which are matters of ordinary observation, and require no evidence to support them (for example, the drainage of 1¼ millions of people), render the water of these rivers unfit for potable purposes. These are summarized in the statement laid before the Royal Commission by Dr. Ashby, the Medical Officer of Health of the Borough of Reading. A very similar statement as regards the water of the River Lea was laid before the Commission by another well-known medical officer, Dr. Turner.

The Commissioners indicate no standard of "efficient filtration;" considering that it did not come within the terms of their reference to lay down the exact regulations as regards filtration. But, after alluding to the fact that, before the water can be brought into a suitable condition for delivery and consumption, it must be treated by subsidence and filtration, and that the quality of the water after delivery depends largely upon the thoroughness with which they are carried out, the Commissioners state: "We cannot shut our eyes to the fact that the provision for these purposes differs enormously in the different Companies, and in some of them is, to our mind, quite inadequate."

The conclusion which we draw from this portion of the report is that, in the opinion of the Royal Commission, provided that the greatest care be constantly taken to prevent such pollution as above described, and provided that efficient systems of filtration be always applied, the Thames and Lea water can be so treated that its danger as an agency for the spread of disease may be reduced to a minimum, and the water may be made sufficiently good for potable purposes.

We believe that every populous town of the United Kingdom situate upon a large river originally derived its water supply from that river; but, in nearly every case, the inhabitants, under the most competent advice of their time, abandoned the use of the river for drinking purposes, and sought a purer supply from a source less liable to contamination than a river draining an inhabited and cultivated watershed. The rapid increase of population in the Thames and Lea Valleys along the whole length of the streams above the points of intake seems to us to render inevitable the conclusion that a similar course will, sooner or later, have to be adopted with regard to London. Since the date of the Royal Commission, water in a time of flood has been delivered, in London even, in a state of turbidity and discoloration, and full of suspended matter obvious to everybody. We do not consider it expedient that London should continue so largely dependent on a water which can only be maintained clear and innocuous by artificial means and processes which are now, as the Commission report, "quite inadequate," which demand great improvements at a vast cost, and which even then cannot be always relied upon when applied to the large volumes of water required by London and its neighbourhood.

Beyond the question of suitability of the water from the Thames and Lea, there is a further question which arises in the Commissioners' recommendations as regards the quantity available. We gather from the report and evidence before the Royal Commission that, if the population increases as generally anticipated, the quantity available from these sources will not suffice beyond the year 1931.

In order to meet the deficiency in means of storage and filtration, which appears to have been ultimately admitted even on behalf of the Water Companies, various schemes were submitted to the Commission. These were condemned, with the exception of certain storage reservoirs on the Lea and certain others in the neighbourhood of Staines; but with reference to the latter proposal, the Commissioners themselves refer to it with very qualified commendation. They say: "Broadly speaking, and without committing ourselves to details, we may say that the conception of this Staines scheme of storage commends itself to us as the best which has been suggested. With regard to this scheme there is no assurance either that the large area of land which would be required could be obtained, or that the inhabitants of the Thames Valley would assent to the abstraction of water which the scheme involves, or that all the London Water Companies would concur in any such scheme when its cost and details are understood. Nay, it has been practically abandoned by the Companies themselves, as most of those who take water from the Thames have already brought forward plans of their own which are inconsistent with it.

Apart, however, from these considerations, we have carefully considered how far the construction of such reservoirs would be practicable; and the Engineer has submitted to us a valuable report on the question of the probable cost of constructing and maintaining a storage system of the kind referred to—*i.e.*, one capable of supplying 240 million gallons a day. We have circulated this report to the Council, and give here merely the results he arrives at. He takes two different bases of calculation: (1) The known past expenditure upon the works of the eight existing Companies, reckoned at so much per million gallons a day; and (2) the estimated cost per million gallons, given in evidence lately by the Engineers of the various Companies, in relation to the construction of similar works. On the first basis, he arrives at a total capital cost of £21,246,916; on the second basis, he finds the minimum capital cost would amount to £15,000,000, without taking into account distribution. In both cases, the annual cost of pumping and maintenance would amount to some £430,000.

We have repeatedly informed the Council that the Engineer is, with a competent staff of assistants, investigating other sources of supply; and we have had several reports from him on the subject. The Council will appreciate the magnitude and complexity of such an inquiry, and the absolute necessity, before any scheme is presented for public discussion as a basis of a Bill, of its being carefully prepared and worked out in all needful detail. Meantime, the data we already possess have satisfied us of two propositions which we do not hesitate to express—namely, that the suggestion of supplying the future wants of the Metropolis by a large increase in the amount of water abstracted from the Thames and Lea, coupled with the formation of a vast system of reservoirs, and conditioned as it must be by enhanced precautions for the prevention of pollution and for better filtration, is not one which should, in the best interests of the people, be adopted, even in the very doubtful event of its being practicable at all; and that such future supply can, as regards quantity, quality, and relative expense, be far better obtained and furnished by taking the water by gravitation from other available sources.

For the foregoing reasons, we recommend the Council to pass the following resolutions:—

(1) That the Council is of opinion that the scheme for a system of storage reservoirs, presented to the Royal Commission on Water Supply by the Water Companies, coupled with the proposal to abstract large additional quantities of water from the rivers, is not the proper method of meeting the future wants of London.

(2) That any further c tal expenditure on works in the Thames and Lea Valleys for the supply of London should be regarded as of a temporary character, and should be restricted to such improvements as may be for the time indispensable.

(3) That the true solution of the problem is the obtaining of the necessary additional supplies from a purer source; and that accordingly the Water Committee be instructed to proceed with the preparation of a scheme to be presented for the consideration of the Council as soon as possible, with a view to an application to Parliament for the necessary powers.

Mr. A. Bassett Hopkins, the Chairman of the Committee, in moving the reception of the report, said they did not ask the Council to approve of a particular scheme, or commit themselves to any expenditure until they should have had an opportunity of considering fairly, in all its details, some particular scheme for future supply which would be brought before them. The Committee had come unanimously to the conclusion that the provision of reservoirs at Staines, as recommended by the Royal Commission—accompanied, as it must be, by the enormously increased abstraction of water from the Thames, and the exceedingly expensive system of checking the purity of the water, and by the inspection of the water before it went to the filters, to prevent or lessen the sources of pollution—was not the true solution of the problem of the future water supply of the Metropolis. The Committee did not appear as cavillers with the Royal Commission; but they contended that their position was as strong as that of the Commission. This inquiry of the Commission, voluminous as it was, embraced, after all, only a mere fragment of the question; and the matters left out of the inquiry altogether were as important as those it included. The Staines scheme was impracticable; and he did not believe Parliament would allow it, while the opposition from the district would be enormous. Speaking seriously, he did not believe the Water Companies ever intended to carry out such a scheme; and even if it were carried out, it would only provide for 40 years from 1891. The members of the Commission accepted 40 years as a sufficient period to provide for; while two of them, when acting as experts for Birmingham, gave 60 years as the minimum period for that city. But what was good enough for Birmingham was too good for London. Another objection to the scheme was that the drinking water for London ought not to be drawn from a river passing through a cultivated and populous district. Water taken from such a source could never be absolutely pure. Their own expert reported that in no instance had he been able to pursue his analysis without finding animal remains in the Thames water after it had been through the Water Companies' filters. He had found not merely bacteriological organisms, but others far larger than bacilli, although still microscopically small. The only alternative to the Staines scheme—which, as he had shown, was impracticable—was obtaining additional supplies from a pure source; and he now asked that the Committee should be instructed to prepare a scheme with a view to an application to Parliament for the necessary powers.

On the motion of Sir John Lubbock, seconded by Lord Farrer, the further consideration of the report was postponed.

The following amendment stands upon the *agenda* in the name of Mr. Beachcroft: "That, in view of the facts disclosed by the report of the Water Committee, which lead to the conclusion that the acquisition by the Council of the Water Companies' undertakings may involve the Council in an outlay of over fifty millions, it is essential, before the Council is asked to commit itself further, that the financial aspect of the whole question should be considered; and accordingly that it be an instruction to the Finance Committee to report on the estimated effect of the acquisition of the undertakings of the Water Companies on the county rate, having regard to the recent report of the Chief Engineer, and to the terms of the scheme for the creation of new stock approved by the Council, on the recommendation of the Finance Committee, in July last."

WATER SUPPLY AND SEWAGE DISPOSAL IN SOME LARGE EUROPEAN CITIES.

At a recent Meeting of the Medical Society of the District of Columbia, an address on the above subject was delivered by Dr. J. S. Billings. The following are the principal portions:—

The problem of securing a sufficient and satisfactory water supply for a large city is, in most cases, a complicated and difficult one; and it has been becoming more complicated and more difficult every year, in view of the demands of modern sanitarians that the water shall not be liable to pollution by sewage, and especially by human excreta. The great majority of large cities have been taking their supplies from surface waters in the shape of lakes, ponds, or streams; and, in almost every case, there is more or less evidence that the water is, at times at least, contaminated by human excreta. It is, in fact, impossible to absolutely prevent this at all times, just as it is impossible to prevent in any city the occasional deposit of excreta in streets or alleys. In cities supplied from rivers and streams, we have, in addition to the dangers due to the admission of pathogenic germs, the nuisances arising from turbidity of the supply after heavy rains or melting snow, and also from the growth and death of certain low forms of algæ and of protozoa, producing offensive odours and tastes in the water.

Up to about five years ago, the belief had been growing that after a water had become polluted with the bacteria of typhoid, or of cholera, or with certain organisms which are believed to play an important part in the causation of summer diarrhœa, it was practically impossible to purify it so as to render it harmless, except by the costly process of boiling and aërating it. Recently, however, the old system of sand filtration for large water supplies, which for a time had fallen into disrepute as being unreliable against pathogenic germs, has been again coming into favour, chiefly through the results of experiments

made under the direction of the Massachusetts State Board of Health at Lawrence,* and through the experience of Hamburg and Altona during the cholera epidemic of 1892, to which special attention was called in a valuable paper on water filtration by Professor Koch.

Since then Hamburg has established filtration works; and I went to that city for the special purpose of seeing how these were constructed and managed. They have been described in several official publications and in journals, so that there is nothing specially new in what I have to say about them. Hamburg and Altona form one continuous building area, so that it is impossible for a stranger to see any difference in the character of the buildings or the surroundings; nor, when near the boundary, can he tell whether he is in Hamburg or in Altona, unless it be by observing the uniform of the policemen whom he may meet. The two cities are, however, quite distinct in their forms of government, and, what is more important to us, in their water supply. Hamburg is an old free city of over 635,000 people, which retains many special privileges since it has become a part of the German Empire; while Altona is a Prussian city of about 145,000 inhabitants, in which the conditions of life are in some respects not so satisfactory to the people as are those in Hamburg. Hamburg took its water from the River Elbe above the town, though not above tidal influence, and supplied it unfiltered; while Altona took its water from the same river below the town, where it was highly polluted with sewage, but passed it through sand filters before distributing it to the people.

In the great cholera outbreak in 1892, the cases occurred almost exclusively in Hamburg; and in a map of the two cities, on which the cholera cases are located by red dots, I saw the boundary-line between Hamburg and Altona almost as distinctly marked by the dots as if it had been shaded in for that purpose. It is true that there were cases in Altona; but inquiry showed that, in almost all these cases, the sick had either drunk Hamburg water or water taken directly from the river. One of the most remarkable bits of evidence is furnished by a small court, the houses about which are occupied by several hundred people. This court is in Hamburg on the boundary-line between it and Altona; but for some reason it was not supplied with water from the Hamburg works, but from those of Altona. Now, on the map just referred to, there are no red dots on this court, although they surround it on three sides—the fourth or Altona side being free. And there was a very significant sign at the entrance to this court: "*Hamburger Gebiet, Altona Wasser;*" so that I was not surprised to find that the rents of rooms in this court had been decidedly higher than those of similar rooms in the immediate neighbourhood, since its inhabitants had the benefit of both the privileges of the free city and of the pure water of the Prussian town.

The municipal authorities of Hamburg had decided in 1890 to construct a system of sand filters for their supply. After the cholera outbreak, work on the new system was pushed vigorously; and it was put into operation in May, 1893. At the same time, the point of intake was moved higher up the river. But even at this point, the river water is still impure, being contaminated by the sewage of towns higher up, and by the numerous barges and boats on the river, so that the water contains over 4000 bacteria per cubic centimetre; and among these during this last summer there were at times forms of spirilla hardly to be distinguished from the genuine cholera spirillum.

The essential features of the new filtration works† are: (1) The use of sedimentary basins; (2) the dividing of the filtering surface into numerous small areas, each of which can be at once disconnected without interfering with the others; and (3) the management of the work under constant bacteriological inspection. There are four settling-basins, each holding water enough for one day, and having an area of about 20 acres. One of these is filled, and the water left for 24 hours, to allow the settling of the larger suspended particles of clay, &c. The cleared water is then pumped on the filter-beds, the sediment removed, if there is enough to make it necessary, and the basin made ready for a fresh supply. Last summer there were 22 filter-basins in use; but more are to be added, for which space has been reserved. These basins are parallelograms, each having a surface of about 2 acres. The filtering substance is composed of a layer 3 feet in depth of fine sand, resting on 8 inches of coarse sand, below which is an 8-inch layer of gravel, and an 8-inch layer of small stones. The water is admitted with special care, to disturb the surface as little as possible; and the supply is regulated in order to secure a depth of water of about 3 feet above the sand surface. This height is an important matter, for upon it largely depends the rate at which the water passes through the filter; the great object being that this rate shall be uniform all over the bed, and that it shall nowhere exceed 100 cubic metres per hour. There are special and ingenious arrangements to secure this. Each filter-bed has a separate outlet, with the means of obtaining samples of the filtered water; and samples from each filter are tested bacteriologically once a day, under ordinary circumstances. As a rule, the number of bacteria found is between 10 and 40 per cubic centimetre. If they rise to 100 per cubic centimetre, it is concluded that either the depth of the water over the filter-bed is too great, or that there is something wrong with the filter. When the filter becomes so obstructed by slime that the required amount of water does not pass, it is emptied, the surface layer removed, and fresh sand put in its place.

The construction of these filter-beds might be improved. They would be safer if they were half their present size, and doubled in number; but at present they seem to be doing their work well. The bacteriological laboratory, which is the regulating brain of the works, is a new building specially constructed for the purpose, well fitted, and under the direction of Dr. Dunbar, an American by birth, who has been for a long time a student and worker in the German laboratories.

Warsaw, situated on the left bank of the Vistula River, has a population of over half a million, which is rapidly increasing; and the water-works, designed by Mr. Lindley, of Frankfort, are intended to supply about 1,200,000 cubic feet a day.‡ The water, taken from the Vistula, is pumped to a high-level filtering-station, where there are to be six groups of covered filters; each group consisting of six beds, and each bed having a surface of 22,500 square feet. The filtering material is arranged over each, the same as at Hamburg; there being 24 inches of sand on the top, and 38 inches of gravel and pebbles below. All the beds are covered with cross-vaulting, supported on monolithic granite columns.

The water first enters the settling-basins, and passes slowly (250 feet in 36 hours) to the outlet-pipes leading to the filters. The rate of filtration on the beds is from 5 to 8 feet downwards in 24 hours. As the whole course of the water from the intake at the river to the consumer is under cover, the influence of light, dust, and temperature is reduced to a minimum; and the results in diminishing the death-rate of the city, and especially the death-rates from typhoid fever and diarrhœal diseases, have been very remarkable. It is interesting to compare the Hamburg and Warsaw systems with the one recently put in operation at Lawrence (Mass.) for filtering the very impure water of the Merrimac River. This consists of a filter-bed of about 2½ acres in area containing sand about 4½ feet deep, which is underdrained. The water flows on to this surface for about 16 hours a day, and passes through at the rate of 2 million gallons per acre in 24 hours. According to the report of Dr. Fuller, the number of bacteria per cubic centimetre is reduced from 9000 to 150. Both at Hamburg and at Lawrence, the death-rate has been markedly reduced since the filtering was commenced.

There are two modes of explanation of the action of such filters as these. The first is that of Dr. Koch—that it is effected by the surface layer of slime, and that only about 1 foot of the sand is of any real use; the action being partly mechanical and partly biological. The second—that advanced by the Massachusetts Board—is that it is entirely biological; being effected by aërobic bacteria which adhere to the grains of sand to a greater or less depth. The Massachusetts experiments were at first conducted with intermittent filters, to allow the oxygen of the air to have access to the bacteria which need it; but it is now thought that ordinary river water contains enough oxygen in solution to supply the needs of these bacteria, and that the filtration may be constant, and two or three times as rapid as has heretofore been considered safe. This seems to be confirmed by some experiments reported by Herr W. Kummel, the Engineer of Altona. He found that, with a velocity of 40 millimetres per hour (4 feet per day), the number of micro-organisms varied from 11 to 97; at 100 millimetres per hour, from 5 to 79; and at 200 millimetres, from 7 to 72 per cubic centimetre. The three filters were exactly alike; and the water supplied was the same. The permissible velocity of filtration will vary for different waters, and for the same river at different seasons; hence it must be a matter of constant adjustment and regulation for each water-works. When a filter is cleaned, and new sand is placed in the top, it is four or five days before the water passing through is sufficiently free from micro-organisms to be safe. This water should therefore be allowed to run to waste.

Engineers are seeking for a method of filtration which will be more rapid and continuous, while giving a pure water. Perhaps the latest thing in this direction is that which is being tried at the city of Worms, by forcing the water under pressure through the walls of large cylinders made of a sort of artificial stone analogous to the Chamberland or Pasteur filter; but the results are not yet definite. Another method is to combine chemical treatment with filtration, as is done at Antwerp, where an impure supply is passed through revolving cylinders containing fragments of iron, which kill many of the micro-organisms.

It will, of course, occur to many that, if filtration of very impure river water through less than 5 feet thickness of sand is sufficient to render it harmless, subsoil water taken from a depth of 25 or 30 feet ought also to be harmless under all ordinary circumstances; and this is, no doubt, the case. The exceptions occur in the case of shallow wells, which become polluted either through fissures and crevices connecting with a leaky sewer or privy vault in the vicinity, or by surface matters passing down the side of a well of the old form—that is, 2 or 3 feet in diameter. With iron-pipe wells, the danger of this last form of contamination is small; and, with care, it may be reduced to nothing. The soluble portions of sewage may pass with little change through 50 feet or more of soil or sand; and in this way the chemical analysis of a well water may show, from the amount of chlorides, nitrates, and other nitrogen compounds, that sewage is being filtered into the stratum of subsoil water from which the well takes its supply, and yet the fæcal bacteria from such sewage may all be intercepted and destroyed by the natural filter. Thousands of wells in this condition exist in the smaller cities and towns of America. Yet the water from them has been used for years without producing evident ill-effects; and a bacteriological examination of them would show that they do not contain fæcal or pathogenic organisms. Such wells should be considered as suspicious; and where a good general water supply is available, they should be closed, although this will often be strongly opposed by the people in the neighbourhood, because the water from such a well will often be cooler, clearer, sparkling, and decidedly more agreeable to the taste than the water from the ordinary supply.

The importance of using natural filter-beds of soil and sand as sources of a general supply is well known to both American and European engineers. But in many localities it is impossible to do this; and, in any case, the results must be at first somewhat uncertain, since it requires prolonged pumping tests to determine the permanent capacity of a subsoil supply. One of the most striking systems of works of this kind has been put in operation at Frankfort-on-the-Main—a city which now has about 200,000 inhabitants. Going by rail to a little station some six miles from the city, I walked a few hundred yards through a pine forest, and came to a small building, the purpose of which it would be very difficult for a stranger to guess. Entering it, I descended a spiral stairway to a depth of 50 feet, and at the bottom found a tunnel, dimly illuminated with candles, and extending indefinitely into the distance. This tunnel was egg-shaped in section—the small end upward, being just the reverse of a sewer—and was lined with white or light straw-coloured bricks. Along the bottom extended an iron pipe; and at intervals this pipe was connected with vertical tubes piercing the bottom of the tunnel. Each of these vertical tubes was a tube-well; and in the centre of the top of the tunnel, immediately over each well, was the opening of the iron pipe through which the well had been bored. These wells are copper tubes 2 inches in diameter, closed at the bottom, perforated, and

* See JOURNAL, Vol. LXIV., p. 1127. † *Ibid.*, Vol. LXII., p. 1000.

‡ 1 cubic foot = 6·23 gallons.

encased with copper wire to prevent sand from entering, and sunk to a depth of 40 feet in the subsoil water. This tunnel is about 1½ miles long—consisting of two arms of nearly equal length, which meet at a very obtuse angle, and containing about 120 of these tube-wells. The average depth of the subsoil water is about 50 feet below the surface of the ground; and the bottom of the tunnel is just at the top of the subsoil water. At the point where the two arms of the tunnel unite, a large pit has been excavated, and lined with brick; and in the subterranean tower thus formed are the powerful pumping-engines which draw the water from the wells, and force it to the city. It is practically a pure cool spring water of nearly constant temperature at all seasons of the year. For 3 square miles around the pumps, the collecting surface is practically an uninhabited forest, kept clear of undergrowth; and the experience of the last three years indicates that the supply will be sufficient for the needs of the city for years to come. These works, as well as the sewage works of the city, were planned and carried out by Mr. W. H. Lindley, the Chief Engineer of the city, who is also in charge of the new sewerage works of Warsaw and of several smaller German cities, and to whom I am under many obligations for information and friendly aid.

The diminution in typhoid fever which has occurred in Frankfort and in Warsaw, following the introduction of improved water supply and of model sewers by Mr. Lindley, has been very remarkable; and some striking diagrams illustrating this were shown by Mr. Lindley at the Hygienic Congress at Budapest. Of course, the practicability and utility of such water-works as those of Frankfort depend on the subsurface stratification, and the character of the surface of the collecting area from which the subsoil water is derived. At Budapest they are constructing new water-works on the banks of the Danube a few miles above the city; taking the supply from tube-wells located about 100 yards from the bank of the river. Under such circumstances, the layer of subsoil water from which the supply is derived does not usually come from the river, but from the adjacent valley surface and hillsides, because the bottom of the river is usually nearly impervious to water, on account of the fine clay silt which accumulates upon it.

Dresden has also a subsoil water supply, derived from a collecting gallery about 570 feet long; but it is doubtful whether this supply does not at times receive water from the River Elbe. In Paris, the water supply is from two sources—one the impure water of the Seine, which is intended to be used only for street watering and similar purposes; the other, a comparatively pure water from springs at a distance, to be used for drinking only. This last source of supply has been at times insufficient; and the Seine water has been turned into the pipes conveying the drinking water, with very bad results as regards the health of the city. This plan of a double supply is one that has been often discussed by engineers, and especially for cities near the sea, for which a salt water supply might be furnished for baths, water-closets, street sprinkling, fountains, sewer flushing, fire service, &c.* This would certainly be much less dangerous to health than a double supply like that of Paris.

The securing of an abundant and pure water supply for all parts of the city appears to me to be the most urgent need of Washington at the present time. The system of sewerage of the city is now in a fair way of being made satisfactory, so far as Washington itself is concerned; but we cannot yet say that we have a definite plan for making the water supply what it should be. At certain times of the year, the river water is so loaded with sediment as to be unfit for bathing, as well as for drinking and cooking purposes. It contains fæcal bacilli at all times, although these are probably for the most part derived from the excreta of horses and cattle, and not of man; and it is probable, although not proved, that it at times contains organisms or substances capable of producing diarrhœa in persons not accustomed to its use, and that the typhoid bacillus is not absolutely excluded from it, although it has never been actually found in it. The engineers desire to increase the certainty of a constant sufficient supply by raising the dam; and they have submitted estimates for the purpose. But the plans for rapid filtration and for sedimentation which have been proposed do not appear to merit the approval of the medical profession, in view of the recent experience of Hamburg and Lawrence. Sedimentation alone will not give us satisfactory results; and rapid forced filtration through steel cylinders, with or without the addition of alum or other chemicals, while quite as costly as the simple sand filtration, does not give an equal guarantee of the purity of the water.

It is very desirable that a careful and systematic examination of the Potomac River water should be made; samples being taken at intervals as high up as Harper's Ferry. This examination should cover a period of at least one year, and should include not only a study of the bacteria but of the lower algæ and other minute organisms in the water. This would require the services of a skilled bacteriologist, and an assistant with a good laboratory, all of which should be provided by the District Government. No large city in America has at present a thoroughly safe and entirely satisfactory water supply. Probably Philadelphia is the worst off in this respect; and New York and Baltimore are among the best. But Washington ought to be the best. For the capital of the nation, the expenditure of $5,000,000 to secure at all times a pure, transparent water should be considered as a wise and perfectly proper one, which in 30 years will be more than repaid by the increased value of property throughout the city, arising from its great desirability as a place of residence.

With regard to the quantity of water required for the future needs of the city, it may be well to remember that at least one-half of our present supply is wasted through leaky fittings, and in other ways which have no connection with household use. With a proper system of inspection and stamping of all water-supply fittings, of district meters, and of meters for Government buildings and manufacturing establishments, the average daily consumption of water in the district should not exceed 60 gallons per head; whereas it has been over 150 gallons. It is sometimes urged that the wasted water all passes into the sewers, and helps to keep them clean. But the tricklings from leaky fittings have no effect in this way, and are a pure waste, which must be done away with if we wish to have a good filter system.

* Projects have, at times, been set on foot for providing London with a supply of sea water; and a motion was lately on the *agenda* of the County Council to refer the matter to a Committee.—ED. J.G.L.

With regard to sewage disposal, I will speak only of what I saw in Frankfort and in Paris. In Frankfort, they are using the method of chemical precipitation with sedimentation—adding milk of lime and clay to the sewage, which then flows slowly and uniformly through long rectangular tanks in which the precipitation takes place. A fairly clear and inodorous effluent is thus obtained, which is permitted to flow into the river. The precipitating-tanks are cleared in succession; the sludge being pumped out into large pits, from which it is removed by boats or carts at the expense of the farmers who use it. The works are on the bank of the river below the city, are entirely underground (being lighted from above), and are fine specimens of masonry. There is little offensive odour about the place, though an ammoniacal smell is perceptible. By this process, the suspended matters in the sewage are removed, the organic matters in solution are diminished, and the number of bacteria is reduced—the greater portion of the fæcal bacteria being killed by the lime. It cannot be said, however, to furnish an effluent which is not at times dangerous; and the Engineer (Mr. Lindley) has recommended intermittent filtration through soil as an addition to, or substitute for, the present plan.

In Paris, about one-fourth of the sewage of the city is now disposed of by irrigation, at a point some five miles from the city, near the bank of the Seine. I traversed the principal sewer from near Notre Dame to the Madeleine—going part of the way in a car propelled by an electric motor, and part of the way by boat. The view thus obtained is a very striking one, and is one of the "sights" of Paris. Usually about 200 people are taken through at once. In this huge main conduit or subway are suspended water-mains, pipes for conveying compressed air, and wires for electrical communication of various kinds. Paris has a great advantage over most other cities in possessing these large subways beneath her principal and most crowded streets. The sewage-pumping works, by which the contents of this main sewer are forced across the Seine to the irrigation grounds, are situated near the Clichy Bridge.

The irrigation grounds are in two parts—one, a large experimental garden owned and managed by the City; the other, large fields owned by private individuals, upon which is pumped so much of the sewage as the cultivators may desire. In both the soil is a very light sandy loam, porous and easily underdrained, and naturally poor, as is shown by the sparse and stunted vegetation on the parts which are not irrigated. In the experimental garden, an attempt has been made to show the effects of sewage irrigation on every form of vegetable growth which the climate permits—including grass, trees, shrubbery, and a great variety of vegetables and flowers. The result is extremely satisfactory, as regards the luxuriance of growth of the various plants; and the effluent water which issues from the underdrains forms a sparkling brook of crystalline water, in which the fish playing about can be distinctly seen, and which is claimed to be as pure and harmless as spring water—the superintendent drinking a glass of it by way of demonstration. This is, of course, not proof. But some of these effluents are used by the people for drinking purposes; and Dr. Feltz reports that in 15 years there has been no case of typhoid fever among them. There is no odour about the gardens, nor has there been any sickness which could be attributed to the irrigation. The lettuce and similar plants are grown on ridges, between which the sewage flows in the furrows, and rapidly sinks into the earth; the object being to keep the leaves and stalks from contact with it. No doubt this is done in the garden under strict supervision; but I confess that I should feel dubious about salads grown under the rough-and-ready methods I saw employed on the lands of the private proprietors. While there was no odour of sewage in the gardens, there was on the fields.

I have said that about one-fourth of the sewage of Paris is disposed of by these irrigation works. The remainder finds its way at present into the Seine, which, when I saw it near Clichy, was one of the foulest streams I have ever examined. Bubbles of gas from the putrefying slime at the bottom were escaping from the dark surface; and no fish could live in it. Works are now in progress to intercept all the sewage, and send it to the irrigation fields, for which purpose a huge inverted syphon, about 12 feet in diameter, is now being constructed beneath the Seine. That now pumped is sent across in iron pipes placed below the Clichy Bridge. The large collecting sewers of Paris are about 14½ feet high and 19 feet wide; those in the ordinary streets, 7½ feet high and 4 ft. 2 in. wide. Only about 9000 houses are at present connected directly with the sewers; the great majority—more than 64,000—having cesspools or receptacles of various kinds.

The number of bacteria per cubic centimetre in the spring water of the Vanne is 800; in the Seine above Paris, 27,000; in the Seine after the discharge from the sewers, 4,500,000; and in the water discharged from the sewage farms, from 410 to 8000—the sewage having about 13,800,000 per cubic centimetre. At Gennevilliers, about 1800 acres are under irrigation. The sum of 116,000,000 frs. has been granted to complete the drainage and irrigation works of Paris, including the purchase of 7500 acres of land.

The conditions governing sewage irrigation or filtration differ from those of water filtration in that sewage does not contain any free oxygen. Oxygen must be supplied, however, to the aërobic bacteria which are to do the work of purification; and hence the flow of sewage must either be intermittent, to allow the air to permeate the soil, or the air must be forced in by mechanical means, as by spraying the sewage, or forcing the air up through the soil by the underdrains. Thus far the intermittent plan is the only one that has been tried with sewage.

Sales of Shares.—At Maidstone, last Thursday, five £10 ordinary shares in the *Maidstone Water Company* realized at the rate of £28 per share.——At Arbroath, on the 9th inst., a gas annuity of £2 16s. of the *Arbroath Gas Corporation* was put up for sale by auction at the price of £92, and was sold for £95 2s. 6d.

Suggested Purchase of the Whitby Water-Works by the District Council.—A resolution was passed at a public meeting of Whitby ratepayers last Thursday week, consenting to the proposal of the District Council to oppose the Bill which has been promoted by the Water Company for the purpose of securing extended powers, and sanctioning an application for authority to purchase the water-works. A poll was demanded, and will accordingly be taken.

NOTES FROM SCOTLAND.

From Our Own Correspondent.

Saturday.

We are still, in Scotland, in the midst of weather of Arctic severity. People are discussing when there was such a visitation before. The general impression is that there has not been so heavy a snowstorm, nor so prolonged intense frost, since 1838. That is probably correct; but it is of little moment in the matter of comparison in connection with many of the conditions of life. It is safe to say that there never was a winter which played such havoc with railway traffic, because railways, in the wilder regions of the country, are of quite recent introduction. There has been gas in any number of towns for the past sixty or seventy years; but there never have been so many people whose gas supplies have been interrupted by frost as this winter, for at least one reason—that there are now so very many more consumers of gas. The same may be said of water supplies. Modern sanitary requirements have led to water-supply pipes being laid against the outer walls of dwelling-houses, where they are much more exposed than they used to be when bath-rooms and lavatories were generally placed in the innermost and darkest corners of the house. The result is a much greater number of frozen water-pipes than were ever known before. This is especially the case in the suburban districts of large cities, where the jerry builder has run riot of late years. In such places, there is real distress on account of the want of water. What is true of one town is true of all. So many service-pipes are stopped by the frost that those in charge of the water supply have been under the necessity of placing stand-pipes on the mains here and there, and supplying water to those who come for it. The carrying of water is a lost art; and a common sight can be seen of a person struggling with a couple of buckets, carrying them so awkwardly that well-nigh half the contents is splashed over the edge, and, settling on the roadway, in a few minutes gets converted into ice—the most dangerous of all ice for pedestrians. The terror of bursting kitchen boilers, arising from several occurrences of that nature during the week, is wide-spread, and is one of the sharpest of all the miseries of this frigid time. Housewives are afraid to light the kitchen fire, so that cooking has to be done on parlour fires; and the dinner of several courses has to be cut down to a plain steak or chop, with bread. It is reported of a Glasgow lawyer that the morning milk being delivered at his door in lumps, and the eggs and ham being frozen solid, the making of breakfast on a small parlour fire was a tedious process; and that he was obliged to content himself, for his morning meal, with three raisins and a half-glass of whisky. The rigours of this winter will be long remembered. With the exception of two days about a fortnight ago, there has been continuous frost since Dec. 28—that is, for seven weeks. For over a week, it has been very intense; and those who have occasion to dig, report that it has penetrated to between 18 inches and 2 feet into the ground. Hitherto main-pipes have not been affected to any great extent; but service-pipes innumerable have been ruined, as will be found out when the thaw comes. The water supply is, of course, the one which suffers most in such weather. I mentioned Edinburgh last week. I am happy to be able to state that, following a note of warning which was given by the Water Trustees, Bailie Archibald was able to intimate at a meeting of the Trust on Thursday, that the citizens had begun to economize the water, and that the consumption had fallen from 13 million gallons to 10 million gallons per 24 hours. That was half-a-million gallons less than could be brought into the service reservoir; and so he felt that they were safe. In Glasgow, it is reported that the consumption of water has gone up from 42 to 63 million gallons per day, which is more than can be brought from Loch Katrine; and the service reservoir at Mugdock has been falling as much as 12 inches in one day. The warning has been given to people to be careful; and it will probably have the desired effect.

Gas supplies have also been very seriously interfered with by the frost. Many tenements have been altogether cut off; and street-lamps are also, in many instances, impossible to light, while of those which are lighted, a vast proportion are merely giving little more than 1-candle power. Gas-fitters are having a busy time attending to what the newspapers always call "frozen gas-pipes." In the middle of the week, there had been about 5000 complaints in Glasgow about defective gas supply. As the number of gas consumers is about 160,000, this shows a tolerably large proportion of defects. I have been endeavouring this week to ascertain how it is that gas supplies are so affected by frost. Setting aside wet meters, I have been putting the question whether dry meters may have their leathers so stiffened by frost as to slow down, or even stop. A gentleman whose word I take to be an authority on the subject, assures me such a thing never happens—at least, in all his experience, he never knew it to occur—the leathers being so treated with a special oil, that they always remain soft and pliable. The meter being all right, then, when a gas supply stops, it must be in the pipes where the mischief lies. On that subject, I have had conflicting statements. One gentleman stoutly maintained to me that gas does freeze; but when pressed to say how, his theory was that when a pipe is exposed to low temperature the gas within it throws down what, not being a scientist, he called a "sweat" upon the inner surface of the pipe, and that that sweat froze until the pipe was wholly blocked. Another gentleman, one whom I looked upon as more reliable, adopted the correct theory of condensation in times of frost, which finds its way to the lower portions of the piping, creating an obstruction while the frost lasts, and then getting taken up by the gas when warmth returns. That is well known; but his theory of the prevalent disturbance to gas supplies is that the mischief is done by the foolishness of putting a too acute elbow upon the pipe where it leaves the horizontal for the perpendicular. Were the elbow, he is convinced, made more round, there would be little likelihood of the condensation settling at that point, and there would be few houses without gas. I give these opinions for what they are worth. Those who are practical men will know their value.

A gas-poisoning paragraph has become a standing order in these "Notes." There have been several this week, and not all confined to Glasgow. There was one in Duddingston, a suburb of Edinburgh, on Tuesday morning. Very curiously, as has been so often the case in Glasgow, the house was one in which there were no gas-fittings; and the gas which got into the house must have come from a fractured main. The frozen surface of the ground is, of course, responsible for driving the gas into the dwellings. In this case, a man and his wife and two children were affected. They were not without warning; and I must say the man and his wife displayed a most callous state of mind, in the face of the danger they were running. At two o'clock in the morning, the man was awakened by his wife, who called upon him to open the window, because there was a strong smell of gas. On his way to the window, he fell down in a stupor, but afterwards succeeded in getting the window open. His wife then got up, but fell in a faint. Putting his wife into bed, the man lay down beside her in a dazed condition. At half-past eight, a milk-girl called; and in endeavouring to reach the door, the man fell two or three times. He left the door open; and a postman who passed shortly afterwards heard moaning, and perceived a smell of gas. Going into the house, the inmates asked him to get assistance. This was done; and the family were taken into a neighbour's house, where they were seen by a medical man, and soon recovered. A little longer, however, the doctor said, in their being rescued, would have made the case a serious one. In Glasgow, on Monday morning, a gas-meter is reported to have burst; and the family having neglected to turn off the gas, there was a strong escape, which affected the inmates of the house, but not seriously. On Tuesday night, an aged man, named M'Millan, was found lying on the floor of his house in the Parkhead district of Glasgow, in an unconscious condition, suffering from gas poisoning. An escape of gas had been detected in the afternoon in an adjoining house; and officials from the Gas Department were called in. They found nothing wrong; and left at half-past seven. At nine o'clock, the woman whose house had been visited heard groans proceeding from M'Millan's house, and procured assistance. The poor man was taken to the Royal Infirmary, where he died of the poison he had contracted. A service-pipe connected with a public lamp outside the building was found to have been snapped by the frost. A third case is reported from Glasgow this week; but it, as well as the first, is not serious. A woman engaged in cleaning silver plate in a mission hall suddenly fell down unconscious. Her employer heard the sound of the fall; and rushing in, noticed a strong smell of gas. A medical man was sent for; and the woman soon recovered. No gas was escaping from the fittings in the house; but an underground railway passes beneath the street at the place, and it may have been the cause of the escape.

To these tales of disaster I have to add another, which occurred in Edinburgh on Monday forenoon—an explosion of gas in a culvert which has been constructed for carrying electric lighting mains. The installation is not yet in working order, so that the gas could not have been fired by electricity. Whether it was fired by men in that department, who were working thirty yards off, is another question. There was a strong smell of gas after the explosion, though not before. The occurrence took place on the Castle Hill. There must have been a considerable quantity of gas in the culvert, as the cover of a manhole was blown sufficiently high to smash the glass and ironwork of a bracket gas-lamp immediately over the manhole. The wall also showed signs of scorching by fire.

The Dunfermline Town Council on Monday were greatly exercised at receiving a reply from the Directors of the Gas Company, declining to enter into negotiations with the Council as to the quality of the gas supplied to the inhabitants. The Council asked a conference upon the subject of the price and quality of the gas, and the way-leave to be paid by the Company for the use of the streets. The Company expressed willingness to confer regarding two of the subjects, but not as to the quality of the gas. The Councillors thereupon adopted a resolution, to be sent to the Directors of the Company, expressing surprise and disappointment at the decision of the Directors, and intimating that they declined to negotiate regarding the way-leave until the matter of the price and quality of the gas be dealt with. I observe that no one was able to say that there was anything wrong with the gas. They have not a photometer, and know nothing as to the illuminating power of the gas, nor as to its composition. The Council evidently have a policy in view, which time will disclose.

CURRENT SALES OF GAS PRODUCTS.

LIVERPOOL, *Feb.* 16.

Sulphate of Ammonia.—There is little change to be reported; and as long as the frost-bound condition of the Continent remains, there will not be much relief to the comparatively stagnant position of business. The shipments, however, have so far been on a satisfactory scale; and Spain continues to absorb a fair amount of supply. It can be readily understood that, under the circumstances, transactions have not been numerous; and no undue pressure has been used by makers to effect sales. There are, even now, signs of requirements which should be quite sufficient to maintain the market from any further decline. The prices quoted to-day are: £11 to £11 2s. 6d. Leith, and £11 2s. 6d. Liverpool and Hull. Nitrate has depreciated in value for cargoes; but the spot quotation is maintained. The shipments for January are advised as rather above 100,000 tons, against about 70,000 tons last year.

LONDON, *Feb.* 16.

Tar Products.—There is a better feeling, and more business is being done, in anthracene; and notwithstanding the reported reduction in the price of alizarine, anthracene is firm and likely to remain so, so long as it is held in the strong hands of the Tar Products Committee. Benzols are moderately steady, with urgent buyers for forward delivery at present quotations; makers' ideas being 1d. to 1½d. more. Pitch is in moderate request, at former rates; the inclement weather very seriously interfering with shipments. Carbolic acid is in request; but buyers have hardly become educated to the increased values fixed by the Committee. It is stated that stocks of carbolic acid in every form were never so low as they are to-day. Owing to

the low values obtaining when offering, there is no inducement to small distillers to extract it from the oil. Solvent naphtha is not selling quite so well; but the advent of spring weather will undoubtedly improve this article. The prices are as follows: Tar, 17s. 6d. to 21s. 6d. Pitch, 34s. to 35s. prompt; 32s. forward. Benzols, 50's and 90's, 1s. Solvent naphtha, 1s. 2d. Toluol, 1s. 3d. Crude, 30 per cent., naphtha, 4¾d. Creosote, liquid, 2d.; ordinary, 1⅞d.; salts, 18s.; pressed, 40s. Cresylic acid, nominal, 1s. Carbolic acid, 60's, 1s. 9d. Anthracene, "A," 1s. 1d.; "B," 10½d.

Sulphate of Ammonia.—The difficulties in respect of shipment, and the unconcealed operations of "bear" dealers, have disadvantageously affected this market. Prices are not so good; and the market is disturbed by a feeling of uncertainty as to the immediate value of the article. Transactions have taken place during the week at prices ranging between £10 17s. 6d. to £11, less 3½ per cent., according to port of shipment and terms of delivery. Gas liquor is offered at 7s. 6d. to 9s. 6d. per ton.

COAL TRADE REPORTS.

From Our Own Correspondents.

Lancashire Coal Trade.—An active demand continues to be reported for all descriptions of round coal suitable for house-fire purposes; but beyond sellers being firm at list rates, there is no quotable change. Prices remain at 10s. 6d. to 11s. per ton for best Wigan Arley; 9s. 6d. to 10s., for seconds Arley and Pemberton four-feet; and 7s. 6d. to 8s., for common house-fire coals. Common round coals do not meet with any appreciably better demand for iron-making, steam, and other manufacturing purposes; but a good deal of surplus supplies of these have been taken off the market for house-fire purposes. Ordinary steam and forge coals now average about 6s. 6d. to 7s. per ton at the pit mouth. Engine classes of fuel continue in fairly good demand, especially for mill purposes; and with an absence of cheap lots offering from other districts, prices are steady—about 7s. 6d. per ton at the pit mouth being the minimum for common, and 4s. 6d. to 5s. for the better qualities of slack. The shipping trade continues very quiet; but with lessened supplies offering at the ports on the Mersey, sellers have no difficulty in getting 8s. to 8s. 6d. per ton for good ordinary qualities of steam coal delivered at the Garston Docks or the High Level, Liverpool. The present demand is generally sufficient to keep pits on practically full time; but considerable difficulty is being experienced in making deliveries from collieries, owing to the stoppage of transit over the canals, which has thrown a good deal of extra business on the railways. The scarcity of waggons results in collieries being occasionally stopped, not for want of orders, but because they have nothing in which to send the coal away.

Northern Coal Trade.—There has been a continued and heavy demand for both gas and household coal; but for other kinds, the demand has been fitful and limited, owing to the stormy weather. Consequently the work at the collieries has been short and irregular. Best Northumbrian steam coals have been especially affected; and the price fell to 8s. 9d. per ton f.o.b., since which time there has been, on the whole, a slight recovery in the demand, but no change in price. Steam small coals are steady, because they are comparatively scarce; and thus they are quoted at from 3s. 3d. to 3s. 6d. per ton, with a fairly good demand. Manufacturing coals are quiet, for somewhat similar reasons; but there is no alteration in the price yet. In regard to gas coals, the demand continues steady. Prices are quiet, but not appreciably lower; from 7s. 3d. to 7s. 9d. per ton f.o.b. being the general quotation for best Durham gas coals. Coke is dull, the consumption having been reduced in the north-west; but the price locally quoted is still about 13s. per ton f.o.b. Gas coke is in large demand, both for export and for consumption at some of the local factories. Several important contracts both for steam and gas coals are just about concluded, among others are one for the Swedish State Railways, and another for the Stockholm Gas-Works. The exact prices can scarcely be given, owing to the inclusion of the freight in the accepted rates; but it may be generally said that the accepted tenders for steam coals are about 1s. 5d. per ton below those of last year. The gas coal contracts are also lower, but only slightly so.

Scotch Coal Trade.—The severe weather is interfering greatly with trade. There is little demand for coal for manufacturing purposes, so many industries being temporarily deranged by the frost. Shipping is also dragging; the chief reason for which is that coal-owners are disinclined to accept the low rates which are being offered. On the one hand, they do not like to face trouble with their men, which might arise if they were to attempt to reduce wages; and, on the other hand, they have hope that on the expiry, at an early date, of the sliding scale in Wales, there may be circumstances arising which will tend to stiffen prices all round. There is at present abundance of all varieties of coal. The quotations this week are: Main, 6s. 3d. per ton f.o.b. Glasgow; ell, 7s.; splint, 6s. 9d.; steam, 7s. 9d. to 8s. Shipments for the week amounted to 107,690 tons—an increase over the quantity in the preceding week of 5540 tons, but a decrease, as compared with the corresponding week of last year, of 17,335 tons. For the year to date, the total shipments have been 568,237 tons—a decrease as compared with the quantity in the same period of last year of 210,887 tons.

Reductions in Price.—The Southport Town Council are proposing to reduce the price of gas in the borough to 3s. per 1000 cubic feet, and to 3s. 3d. in Birkdale. A sum of upwards of £6000 has been realized by the Council in consequence of the increase in price in 1893; and the loss incurred by reason of the coal strike has been made good. ——The price of gas at Beverley (which is now 3s. 9d.) is going to be reduced by the Corporation Gas Committee by 5d. per 1000 cubic feet at the close of the current quarter, and by a further 5d. from Sept. 25 next.——The Directors of the Fleetwood Gas Company have decided to reduce the price of gas from 4s. 2d. to 3s. 11d. per 1000 cubic feet, to take effect as from April 1 next.——The Directors of the Northwich Gas Company have reduced their charge by 2d.—the concession dating back to Jan. 1. If accounts are paid within fourteen days after delivery, a discount of 2½ per cent. is also to be allowed.

Water Gas Plant for the Preston Gas-Works.—We learn that Messrs. Humphreys and Glasgow have recently contracted with the Preston Gas Company for the supply and erection of a water-gas plant of their improved type, in two sections; the combined capacity to be about 1½ million cubic feet per day. In addition to the water-gas plant proper, the contract includes an iron operating floor, oil-storage tanks, exhausting plant, and connecting-pipes. The plant is to be in operation to the satisfaction of the Company's Engineer and Secretary (Mr. H. Green) for next autumn's business.

Felixstowe and Walton Water Company's Bill.—The Felixstowe District Council have resolved to oppose the Bill of the local Water Company; and yesterday week they adopted the draft of a petition, in which their various objections are set forth. It states that the Company allege the amount of their capital to be £50,000, divided into 5000 shares of £10 each, of which 3491 shares have been subscribed and £26,590 has been paid up. The petitioners deny that this amount has been paid up, and that the Company have property and assets of any such value. The Company also ask for powers which will, the petitioners contend, if granted, seriously impair and prejudice the rights of the ratepayers, and propose to make excessive charges in order to meet a grossly overweighted capital. The Council further claim that, as they could provide a water supply with greater economy and efficiency, a proviso should be inserted to enable them to purchase the water undertaking at any time upon reasonable terms. The preamble of the Bill is declared to be untrue, and incapable of proof.

The Bolton Corporation and the Redemption of their Gas Annuities.—The Bolton Corporation have lately made an important departure with regard to their gas annuities; and a scheme has been approved for the redemption thereof. This action has been taken in consequence of the Local Government Board having expressed disapproval of securities of an irredeemable nature, coupled with the fact that Parliament now refuses to allow the issue of this class of security. The Corporation propose to give, in exchange for each annuity, 3½ per cent. Bolton Corporation stock to an amount equal to 30 years' purchase of the annuity; this stock to be redeemable at par at the expiration of 40 years from the date of issue—viz., in 1935, at the same time as the rest of their stock. The stock so taken in exchange will yield an annual income slightly in excess of the yearly amount now enjoyed by the annuitants; and, being issued at par, it at once becomes realizable at a premium of from £15 to £18 per cent.—this being based upon the present value of such securities on the Stock Exchange. There is the further advantage that the investment will then constitute a security in which trustees are duly authorized by the Trustee Act, 1893, to invest; while, as a general rule, they cannot lawfully invest in, or continue holders of, the annuities. As the result of this action, the purchase of a number of annuities has already been effected by the Gas Committee.

Salaries in the Widnes Corporation Gas and Water Department.—At the last meeting of the Widnes Town Council, the Chairman of the Gas and Water Committee (Alderman Timmis) submitted for approval a revised scale of salaries of officials in the Gas and Water Department. Under it, Mr. Isaac Carr, the Gas and Water Engineer, was to have an advance, as from the beginning of the year, of £50; Mr. F. Thorpe, the Assistant-Engineer, one of £20; and the two draughtsmen, £10 each. He also brought up a resolution that Mr. Carr should be granted permission to advise other authorities, and to receive payment for his services, provided that, before accepting any employment, he should first obtain the sanction of the Chairman of the Committee, who was to report the matter at the next meeting; and no employment was to be accepted and entered upon by Mr. Carr which might in any way interfere with his ordinary duties. Objection was taken to the proposal to increase the salaries in the present depressed state of trade; and it was rejected by 18 votes to 6. With regard to outside work, an amendment was proposed to the effect that, before accepting appointments for other authorities, Mr. Carr should obtain the sanction of the Committee, and in urgent cases of the Chairman, who should report to the Committee at its next meeting. Alderman Timmis expressed his willingness to accept this amendment; and it was carried unanimously.

Suffocation by Gas at Bristol.—Early on Saturday week, Rebecca Coles, aged 72 years, and Annie Blanche Coles, aged 14 years, her grand-daughter, were both found in an unconscious condition in a room occupied by the former in St. Nicholas' Almshouses, Bristol, and both died shortly afterwards. The inquiry into the matter by the Borough Coroner (Mr. Doggett) was held on Monday last week. From the evidence, it appeared that the daughter of the woman occupying the adjoining room visited her mother on the Friday evening, and found her in a fainting condition; there being at the time a strong odour in the apartment. She stayed with her mother during the night; and on adding fuel to the fire early in the morning, there was an explosion under the grate. A few minutes later, there was a second explosion, which appeared to come from Mrs. Coles's room. On entering that apartment, with two men whom she summoned, one corner was found to be in flames, and the old lady and child were unconscious; and before medical aid could be procured, they were both dead. During the previous evening, it was not thought that the odour was that of gas, as there were no fittings in that part of the building. Dr. Carling, who had made an examination of the bodies, stated that the symptoms pointed to asphyxia, due to suffocation, caused by some kind of vapour—it might have been smoke or gas. Mr. J. Hiram Fiddes, the Engineer and Superintendent of the out-door department of the Bristol Gas Company, deposed that, after the accident, he had the road opened, and found that the gas-main had been fractured; and this he attributed to the severe frost. Witness could not say, however, whether the explosion was caused by gas or by an oil-lamp which was found broken in Mrs. Coles's room. There had never, so far as he was aware, been an explosion in a house in Bristol arising from gas leaking from a main, and percolating through the soil. The Coroner thought there was little doubt that a considerable amount of gas had escaped from the fracture of the main, and had worked its way through the earth, and accumulated in the room. After a brief deliberation, the jury returned a verdict to the effect that the deceased died from asphyxia, due to an accidental percolation of gas through the ground into the bedroom from the fracture in the main.

Axminster in Darkness.—Owing to an accident to a gasholder at the Axminster Gas-Works last Sunday night, the town was deprived of a supply of gas. The damage was caused, it is believed, by the severe frost.

The Dewsbury Town Council and the Water Undertaking.—At their last meeting, the Dewsbury Town Council approved of the following resolution which had been passed by the General Purposes Committee: "That this Council are prepared to purchase the whole or any portion of the share of the Heckmondwike District Council in the undertaking of the water-works, and on such terms and conditions as shall be agreed upon between the parties, or, as in the case of difference, shall be settled by an arbitrator to be appointed by the Local Government Board."

The New Water and Sewerage Works for Pembroke Dock.—The scheme of sewerage which Mr. Beesley, of Westminster, has propounded for Pembroke Dock, and which involves the provision of additional water-works, was discussed at a meeting of ratepayers last Friday week. Mr. Beesley's proposals (a general idea of which was given in the JOURNAL for the 22nd ult.) were subjected to severe criticism; and a resolution was passed disapproving of the project, and appointing nine gentlemen to confer with members of the Council, with the view of drawing up a scheme which will meet the requirements of the Local Government Board.

Newport (Mon.) Gas-Works Benefit Society.—The annual dinner of this Society took place on Monday last week, under the presidency Engineer and Manager of the Newport Gas Company, and a member of the Hon. Treasurer, Mr. Thos. Canning, Assoc.M.Inst.C.E., the of the Corporation. After the usual loyal toasts had been honoured, Mr. Canning proposed "The Chairman and Directors of the Newport Gas Company," under whose guidance the concern had, he said, become a large and prosperous one. Referring to the men, he expressed the Board's good wishes for them; saying he could personally testify that no body of men worked so satisfactorily as those employed at the gas-works. In responding to the toast of "Success to the Gas-Works Benefit Society," Mr. J. Whitefield referred to its nineteenth annual report, which, on the whole, was a satisfactory one. There had, he said, been an increase of donations in the past year as compared with 1893. The balance-sheet for the year ending June 30, 1894, showed receipts amounting to £205 9s.; and after paying all demands upon them, and dividing £24 8s. 9d., there was left a balance of £25 10s. 10d. Other toasts followed.

Water Supply in American Cities.—Chicago may now add to its many claims for bigness, says the *Engineer*, that it uses and wastes more water than any other city in the world. Its water consumption, in 1894, as indicated by the pumpage at the eight city pumping-stations, averaged 238,372,300 gallons a day; making a total for the year of slightly over 87,000 million gallons. This is probably the largest amount of water used by any city in the world; London being the closest rival—its consumption in 1892 having been 216 million U.S. gallons per day. As this was an increase of about 14 million gallons over the consumption in 1890, it may be assumed that the London daily consumption in 1894 was between 230 million and 235 million gallons. Next comes Philadelphia, with a daily consumption of 197,344,806 gallons in 1894, which, like the supply of Chicago and London, is all pumped. Fourth in the list is New York, with a gravity supply of 183 million gallons in 1894, some of which, however, had to be pumped for the high service. The daily consumption per head in these four cities ranges from about 40 U.S. gallons for London, to somewhere in the vicinity of 160 gallons for Philadelphia. The exact figures for the American cities cannot be given, owing to uncertainties as to their exact population; but allowing 1,925,000 inhabitants as an average for New York, the consumption represents about 95 gallons per head per day. As in Chicago, of course an enormous proportion of this is lost by leakages large and small.

GAS AND WATER COMPANIES' STOCK AND SHARE LIST.

(For Stock Market Intelligence, see ante, p. 365.)

Issue.	Share	When ex-Dividend.	Dividend or Div. & Bonus.	NAME.	Paid per Share	Closing Prices.	Rise or Fall in Wk.	Yield upon Investment.
£			p.c.	GAS COMPANIES.				£ s. d.
590,000	10	11 Oct.	10½	Alliance & Dublin 10 p. c.	10	21–22	..	4 15 6
100,000	10	,,	7½	Do. 7 p. c.	10	14–15	..	5 0 0
300,000	100	2 Jan.	5	Australian (Sydney) 5 % Deb.	100	105–107	..	4 13 4
200,000	5	14 Nov.	6½	Bombay, Limited	5	6½–6¾	..	4 16 5
40,000	5	,,	6½	Do. New	4	4¾–5	..	5 4 0
380,000	Stck.	15 Aug.	11½	Brentford Consolidated	100	242–247	+5	4 13 1
180,000	,,	,,	8½	Do. New	100	190–195	+3	4 7 2
220,000	Stck.	28 Sept.	11	Brighton & Hove Original	100	223–228	+3	4 16 6
888,500	Stck.	30 Aug.	5	Bristol	100	115–120	..	4 3 4
320,000	20	28 Sept.	11½	British	20	50–51	+½	4 8 2
50,000	10	30 Aug.	11½	Bromley, Ordinary 10 p. c.	10	21½–22½	..	5 2 2
51,510	10	,,	8½	Do. 7 p. c.	10	16½–17½	..	4 17 2
328,750	10	14 Nov.	2	Buenos Ayres (New) Limited	10	6–6½	..	3 1 6
200,000	100	2 Jan.	6	Do. 6 p. c. Deb.	100	100–103	..	5 16 7
150,000	20	12 July	8	Cagliari, Limited	20	27–28	..	5 14 3
550,000	Stck.	11 Oct.	13	Commercial, Old Stock	100	280–285	+3	4 11 3
165,000	,,	,,	10	Do. New do.	100	207–212	+4	4 14 2
160,762	,,	13 Dec.	4½	Do. 4½ p. c. Deb. do.	100	130–135	..	3 6 8
800,000	Stck.	13 Dec.	13	Continental Union, Limited.	100	243–248	+3	5 4 10
200,000	,,	,,	10	Do. 7 p. c. Pref.	100	205–210	..	4 15 3
535,000	Stck.	30 Aug.	5¼	Crystal Palace Ord. 5 p. c. Stk	100	117–122	..	4 6 1
486,090	10	31 Jan.	11	European, Limited	10	24–25	..	4 8 0
354,060	10	,,	11	Do. Partly paid	7½	16½–17½	+½	4 14 3
5,646,590	Stck.	14 Feb.	12	Gaslight & Coke, A, Ordinary	100	268–273	+6	4 8 0
100,000	,,	,,	4	Do. B, 4 p. c. max.	100	105–110*	+2	3 12 9
665,000	,,	,,	10	Do. C, D, & E, 10 p.c. Pf.	100	275–280*	..	3 11 5
30,000	,,	,,	5	Do. F, 5 p. c. Prf.	100	130–135*	+2½	3 14 1
60,000	,,	,,	7½	Do. G, 7½ p. c. do.	100	197–202*	+½	3 14 3
1,300,000	,,	,,	7	Do. H, 7 p. c. max.	100	183–188*	+1½	3 14 6
463,000	,,	,,	10	Do. J, 10 p. c. Prf.	100	273–278*	+1	3 12 0
476,000	,,	,,	6	Do. K, 6 p. c. Prf..	100	163–168*	+1	3 11 5
1,061,150	,,	13 Dec.	4	Do. 4 p. c. Deb. Stk.	100	127–130	..	3 1 6
294,850	,,	,,	4½	Do. 4½ p. c. do.	100	140–145	..	3 2 1
908,000	,,	,,	6	Do. 6 p. c. do.	100	188–192	..	3 2 6
3,800,000	Stck.	14 Nov.	12	Imperial Continental	100	239–244	+1	4 18 4
75,000	5	13 Dec.	6	Malta & Mediterranean, Ltd.	5	5¾–6¼	..	4 16 0
560,000	100	1 Oct.	5	Met.of Melbourne, 5 p.c. Deb.	100	111–113	..	4 8 6
541,920	20	14 Nov.	5	Monte Video, Limited	20	15½–16½	..	6 1 2
150,000	5	29 Nov.	8	Oriental, Limited	5	7–7½	..	5 6 8
60,000	5	13 Sept.	7	Ottoman, Limited	5	4¼–4½	..	7 7 4
166,870	10	14 Feb.	2	Para, Limited	10	1½–2½	+½	8 0 0
420,000	100	2 Nov.	6	People's Gas of Chicago— 1st Mtg. Bds.	100	105–109	..	5 10 1
500,000	100	1 Dec.	6	2nd Do.	100	102–107	..	5 12 1
150,000	10	11 Oct.	6	San Paulo, Limited	10	8¾–9¼	..	6 6 4
500,000	Stck.	14 Feb.	15½	South Metropolitan, A Stock	100	345–355*	‡	4 7 4
1,350,000	,,	,,	12	Do. B do.	100	292–297*	+3	4 0 10
290,000	,,	,,	13	Do. C do.	100	305–310*	+1½	4 3 10
775,000	,,	16 Jan.	5	Do. 5 p. c. Deb. Stk.	100	167–172	..	2 18 2
60,000	Stck.	30 Aug.	11½	Tottenham & Edm'nton, "A"	100	225–230	..	5 0 0
				WATER COMPANIES.				
746,021	Stck.	28 Dec.	10⅝	Chelsea, Ordinary	100	292–297	+2	3 8 2
1,719,514	Stck.	11 Oct.	8	East London, Ordinary	100	232–237	−3	3 7 7
654,740	,,	28 Dec.	4½	Do. 4½ p. c. Deb. Stk.	100	150–155	..	2 18 0
700,000	50	13 Dec.	8½	Grand Junction	50	120–123	−1½	3 9 1
708,000	Stck.	14 Feb.	12	Kent	100	305–310*	+4	3 17 5
1,043,800	100	28 Dec.	9½	Lambeth, 10 p. c. max.	100	270–275	..	3 9 1
406,200	100	,,	7½	Do. 7½ p. c. max.	100	207–212	..	3 11 1
330,000	Stck.	28 Sept.	4	Do. 4 p. c. Deb. Stk.	100	135–138	..	2 17 11
500,000	100	14 Feb.	12½	New River, New Shares	100	387–392*	..	3 5 0
1,000,000	Stck.	31 Jan.	4	Do. 4 p. c. Deb. Stk.	100	140–145	..	2 15 2
902,300	Stck.	13 Dec.	6	S'thwk & V'xhall, 10 p.c. max.	100	167–172	−2½	3 9 10
126,500	100	,,	6	Do. D 7½ p.c. do.	100	160–165	..	3 12 9
1,155,066	Stck.	13 Dec.	10	West Middlesex	100	280–285	..	3 10 2

*Ex div.

† Next dividend will be at this rate. ‡ Rise in week, 12½.

GWYNNE & BEALE'S
PATENT GAS EXHAUSTERS AND ENGINES.

Telegrams: "GWYNNEGRAM, LONDON." Telephone No. 2698.

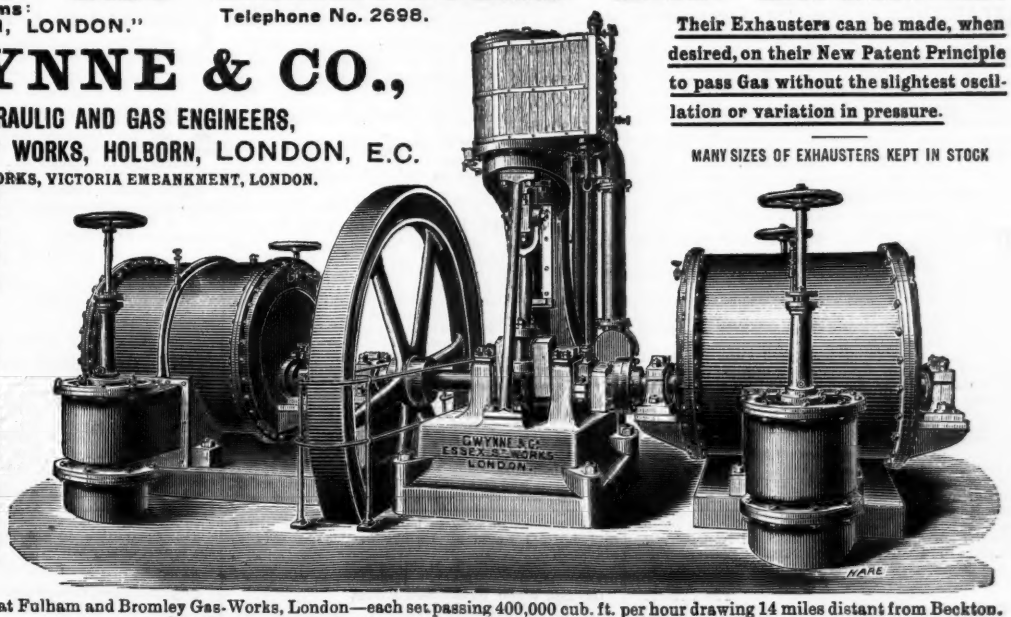
GWYNNE & CO.,
HYDRAULIC AND GAS ENGINEERS,
BROOKE STREET WORKS, HOLBORN, LONDON, E.C.

Late ESSEX STREET WORKS, VICTORIA EMBANKMENT, LONDON.

They have completed Exhausters to the extent of 32,000,000 cubic feet passed per hour, which are giving unqualified satisfaction in work.

Makers of GAS-VALVES, HYDRAULIC REGULATORS, VACUUM GOVERNORS, PATENT RETORT-LIDS, STEAM, PUMPS for Tar, Liquor, or Water; CENTRIFUGAL PUMPS and PUMPING ENGINES, specially adapted for Water-Works, raising Sewage, &c.

Also GIRARD and other TURBINES, HIGH SPEED ENGINES, DYNAMOS, &c., &c.. for ELECTRIC LIGHTING.



Their Exhausters can be made, when desired, on their New Patent Principle to pass Gas without the slightest oscillation or variation in pressure.

MANY SIZES OF EXHAUSTERS KEPT IN STOCK

Exhausting Machinery at Fulham and Bromley Gas-Works, London—each set passing 400,000 cub. ft. per hour drawing 14 miles distant from Beckton.
Catalogues and Testimonials sent on application.

NOTICE TO ADVERTISERS.—COPY FOR ADVERTISEMENTS for the "JOURNAL" should be received at the Office *not later* than TWELVE O'CLOCK NOON ON MONDAY, to ensure insertion in the following day's issue.

Orders for Alterations in, or Stoppages of PERMANENT ADVERTISEMENTS, should be received not later than the FIRST POST on SATURDAY.

GAS PURIFICATION AND CHEMICAL COMPANY, LIMITED.

OXIDE OF IRON.

O'NEILL'S Oxide has a larger annual sale in the United Kingdom than all other Oxides combined. Purity and uniformity of quality guaranteed. Pamphlet, "How to Purchase Bog Ore," to be obtained on application.
JOHN WM. O'NEILL, Managing Director, Palmerston Buildings, Old Broad Street, London, E.C.

ANDREW STEPHENSON, AGENT. All communications *re* Oxide to be addressed to Palmerston Buildings.

WINKELMANN'S "VOLCANIC" CEMENT. Fire Resistance up to 4500° Fahr. In use in most Continental Gas-Works, and in more than 300 British Gas-Works.
ANDREW STEPHENSON,
182, GRESHAM HOUSE,
OLD BROAD STREET,
LONDON, E.C.
Telegrams: "Volcanism, London."

AMMONIACAL LIQUOR Wanted.
BROTHERTON AND CO., Ammonia Distillers. Works: BIRMINGHAM, LEEDS, and WAKEFIELD.

GAS TAR Wanted.
BROTHERTON AND CO., Tar Distillers. Works: BIRMINGHAM, LEEDS, and WAKEFIELD.

SPENT OXIDE Wanted.
BROTHERTON AND CO., Chemical Manufacturers. Works: BIRMINGHAM, LEEDS, and WAKEFIELD.

BROTHERTON & CO.
Offices: Commercial Buildings, LEEDS. Correspondence invited.

HAMBURG (GERMANY),
ED. ZIETZ, I. BRANDSTWIETE, 20,
COMMISSION BUSINESS,

AGENT for the Deutsche Gasglühlicht Akt. Ges. Berlin, offers his services FOR THE SALE OF LIGHTING AND HEATING APPARATUS of every description; also of any Patent Novelties.
Business connections with all Countries.
Correspondence in all modern Languages.

ENGINEER (Young) wishes a Situation as ASSISTANT in Gas-Works. Good Mechanic and Draughtsman. Knowledge of Gas Manufacture.
For References, &c., apply, by letter, to No. 2483, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

THE Advertiser (aged 38), at present Engineer and Manager of Gas-Works, desires a remunerative position abroad. One in which he will have full scope for his talents and energy. He has produced first-class carbonizing and general working results, has a knowledge of several Languages, and can furnish good Testimonials or References.
Please address No. 2481, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

WANTED, a Superior Foreman or SUPERINTENDENT for a Midland Gas-Works of 1 million daily capacity. Must be a good Carbonizer, able to make Referee's and other Tests, and used to Control of Workmen. House, Coal, and Gas provided.
Apply, by letter, stating Salary required, and enclosing *copies only* of Testimonials, to No. 2482, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

CITY OF CARLISLE.

APPOINTMENT OF GAS AND WATER ENGINEER AND MANAGER.

THE Corporation of Carlisle are pre- pared to receive APPLICATIONS for the appointment of ENGINEER AND MANAGER of their Gas and Water Works.
Gentlemen desirous of becoming Candidates for the appointment may obtain a statement of the duties of the Office and Conditions of Candidature on application to the Town Clerk, Carlisle.
The Gentleman to be appointed must be a duly qualified Engineer, not exceeding 45 years of age, and will be required to devote his whole time to the discharge of the duties of his Office.
The Salary will be £500 per annum clear of all expenses. The Corporation will provide Offices and necessary Staff.
Canvassing Members of the Council, either directly or indirectly, is strictly prohibited.
Applications, accompanied by printed copies of not more than six recent Testimonials (which will not be returned), to be addressed to the Chairman of the Gas and Water Works Committee, Gas and Water Offices, Carlisle, and marked "Appointment of Engineer," on or before the 4th day of March next.
By order,
A. H. COLLINGWOOD,
Town Clerk.
Carlisle, Feb. 12, 1895.

W. C. HOLMES & CO., Huddersfield; AND 80, CANNON STREET, LONDON, Contractors for Gas-Works complete, Makers of Gasholders, Purifiers, Scrubbers, Condensers, Retort Fittings, &c., Improved Valves, Engines, and Exhausters. Also Improved Patent Rotary Scrubber-Washers.
*** See Advertisement p. IV., centre of JOURNAL.
Cablegrams: "Ignitor London." Telegrams: "Holmes Huddersfield."

J. & J. BRADDOCK, Globe Meter Works, Oldham.
First-Class Award, Melbourne Exhibition, 1889, for WET AND DRY GAS-METERS, STATION METERS, AND GOVERNORS, PRESSURE-GAUGES, STREET LAMPS AND PILLARS, &c.
Telegraphic Address: "Braddock Oldham."

SULPHURIC ACID.

JOHN NICHOLSON & SONS, Chemical Works, Leeds, specially produce this ACID from BRIMSTONE, for making SULPHATE OF AMMONIA of high quality and *good* colour. Delivery in our own Railway Tank-Wagons or Carboys. Highest references and all particulars supplied on application.

SPECIAL PAINT FOR GAS-WORKS.

JOHN E. WILLIAMS AND CO.,
VICTORIA PAINT WORKS,
MANCHESTER.
Telegrams: "ENAMEL." National Telephone 1759.

GAS PLANT CEMENT.

JOHN E. WILLIAMS AND CO.,
VICTORIA PAINT WORKS,
MANCHESTER.
For all Joints in connection with Oil-Gas Plant and Sulphate Plant.
For all Gas Joints.
For all Tar Joints.
For all Ammonia Joints.

PATENTS FOR INVENTIONS.

J. C. CHAPMAN, M.I.M.E. and Fel. Chartered Inst. Patent Agents. ADVICE ON ALL MATTERS CONNECTED WITH ABOVE.
Information and Handbook on application.
70, CHANCERY LANE, LONDON, W.C.

SADLER AND CO., LIMITED, MIDDLESBROUGH; ULVERSTON (BARROW); PORTSMOUTH; CARLTON; STOCKTON; 315, St. Vincent Street, GLASGOW; and 85, Water Street, NEW YORK. Tar Distillers, Manufacturers of all TAR PRODUCTS, ALIZARINE and other TAR COLOURS, BICHROMES, OXALIC ACID, ALKALIES, LIQUOR AMMONIA, AMMONIA SULPHATE, &c.
Head Office: MIDDLESBROUGH. Correspondence invited.

WANTED, Persons with connection to CALL ON GAS COMPANIES for the Sale of Article in daily use.
State, by letter, Locality and Remuneration expected to No. 2477, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

AN old-established and well-known Manufacturing Firm are prepared to treat with a Gentleman competent to undertake the GENERAL SUPERVISION of the GAS-WORKS DEPARTMENT of their Business, in which Gas-Meters, Governors, Exhausters, Valves, and Testing Apparatus are manufactured.
Applicants must have ability in the matter of Design, Illustration, Construction, and Specification of such Apparatus, and in initiating improved methods of production, and be capable of profitably Managing this branch of Gas Engineering.
Correspondents may rely on the strictest confidence being observed.
Address, giving full Particulars of Experience and Qualifications, with views as to Remuneration, to ARGON, Box 415, care of Sell's Advertising Offices, LONDON.

THE Barnet District Gas and Water Company have the following PUMPING MACHINERY (capable of raising over One Million gallons in 24 hours) and GAS PLANT for IMMEDIATE DISPOSAL, either in one lot or separately:—
STEAM-ENGINE — Horizontal, High-Pressure, Condensing, 24-inch Cylinder, 42-inch stroke.
WELL PUMPS—Two Single-Acting, 14-inches diameter by 42-inch stroke, Valves and Connections to Suction and Rising Main.
FORCE PUMPS — Three Plungers, 12-inches diameter, 20-inch stroke, with Gun Metal Suction and Delivery Valves.
STEAM-BOILERS—Two Cornish, 28 ft. by 5 ft., Flue 32 inches diameter, Mountings and Fittings.
GAS PLANT—Fifty-six each of Cast-Iron Retort-Mouthpieces, 15 in. by 21 in., Ascension-Pipes 6 inches tapering to 5 inches, Bridge-Pipes, Dip-Pipes, and eight Wrought-Iron Hydraulic Mains, 8 ft. 8 in. by 1 ft. 11 in. by 1 ft. 9 in. each, with 4-inch Outlet and Valve.
Applications to view to be addressed to the undersigned, from whom all further Particulars may be obtained.
T. H. MARTIN,
Engineer and Manager.
Gas and Water Works, New Barnet
February, 1895.

GAS PURIFICATION.

OXIDE OF IRON BOG ORE.

BALE & CO.'S Oxide of uniform quality. Sample and Price on application.
OXIDE PAINTS, OILS, SULPHURIC ACID, &c.
120 and 121, NEWGATE STREET, LONDON, E.C.
Telegrams: "BOGORE, LONDON."

OXIDE OF IRON.

FINEST Quality of Natural Bog Ore. Particulars and price, apply to Mr. T. L. ARCHER, 20, Fennel Street, MANCHESTER.

PORTER & CO., Gowts Bridge Works, LINCOLN, Engineers, Ironfounders, and Contractors for the erection of Gas-Works for, Towns, Villages, Mansions, Manufactories, Collieries, and Isolated Buildings, at home and abroad. Manufacturers of Retorts and Fittings, Condensers, Scrubbers, Purifiers, Valves, &c.; also of Girders, Wrought and Cast Iron Tanks, Iron Roofs, &c.
Telegraphic Address: "PORTER LINCOLN."

JOHN RILEY & SONS, Chemical Manu- facturers, Hapton, near Accrington, are MAKERS of SULPHURIC ACID, from Brimstone, for Sulphate of Ammonia making. Highest percentage of Sulphate of Ammonia obtained from the use of this Vitriol. References given to Gas Companies.

HYDRATED OXIDE OF IRON.

PREPARED from pure Iron.
Two or three times as rich as Bog Ore.
Strong action on Sulphuretted Hydrogen.
To be used alone, but will increase activity of other Oxides.
Less than half the price of Bog Ore.
Can be lent on hire.
Write for tabulated results.
READ HOLLIDAY AND SONS, LIMITED, HUDDERSFIELD.

AMMONIA SATURATORS.

WALTER THOMASON and SONS, Chemical Plumbers, &c., and Makers of Lead Saturators, &c., 21, WESTON STREET, BOLTON. Repairs of every description.
Please write for Estimate before ordering elsewhere.

In Paper Covers, Post Free, Price 2s.

S. CARPENTER on the Purification of COAL GAS from CARBONIC ACID and the SULPHUR COMPOUNDS by LIME, OXIDE OF IRON, and ATMOSPHERIC AIR.
S. & H. W. CARPENTER, 3, Bedford Villas, Carshalton, SURREY.

DERBY GAS COMPANY.

GAS EXHIBITION AND COOKERY LECTURES.
DRILL HALL, DERBY, MARCH 27 TO APRIL 6, 1895.

APPLICATIONS for Space invited for all kinds of Gas Apparatus, Lighting Appliances, Gas-Engines, &c. Gas and Service Pipe supplied free up to Stand side. Gas-Stove Makers admitted for sale only exhibiting through local tradesmen.
For terms of Space and all Details, apply to R. FISHER, Esq., Gas Offices, DERBY.
Applications must be received on or before Feb. 27.

FOR SALE—A Cylindrical Station METER; capacity 5000 cubic feet per hour.
Address MALTON GAS COMPANY, Malton, YORKS.

TENDERS FOR TAR.

THE Directors of the Exeter Gaslight and Coke Company invite TENDERS for their surplus TAR for One Year from Lady-day next.
Delivery on Company's Works filled into Purchaser's Tanks.
Sealed tenders, endorsed "Tender for Tar," will be received by the undersigned on or before Tuesday, the 12th of March next; but the Directors do not bind themselves to accept the highest or any tender.
By order,
W. A. PADFIELD,
Engineer and Secretary.
Gas Offices: 248, High Street,
Exeter, Feb. 16, 1895.

GLASGOW CORPORATION GAS.

THE Committee on Gas Supply and Electric Lighting of the Glasgow Corporation are prepared to receive TENDERS for the construction of a GASHOLDER TANK, 220 feet diameter and 45 feet deep, at their Tradeston Gas-Works.
Plans and Specification may be seen, and Schedule of Quantities and Form of Tender obtained, at the Engineer's Office, 45, John Street, on payment of One Guinea.
Sealed offers to be addressed to the Subscriber, and lodged with him before Ten a.m., on Wednesday, the 27th current.
The Committee do not bind themselves to accept the lowest or any tender.
J. D. MARWICK,
Town Clerk.
City Chambers, George Square, Glasgow,
Feb. 14, 1895.

TAR.

THE Direction of the Gas-Works at Rotterdam invites TENDERS for the purchase of the TAR produced during Two Years at most, from the 1st of June next. Yearly production, from about 80,000,000 kg. Coal.

Tenders, stating the time during which the production is desired, the price per hectolitre in Dutch money, and written in Dutch language on stamped paper, must be delivered at the Office of the Gas-Works, not later than the 19th of March, 1895.

Specification may be had on application to the MANAGER of the Gas-Works at ROTTERDAM.

SHEFFIELD UNITED GASLIGHT COMPANY.
NEEPSEND STATION.

TO ELEVATOR MANUFACTURERS, ENGINEERS, ETC.

THE Directors of this Company invite TENDERS for the Manufacture, Delivery, and Erection of Four OXIDE ELEVATORS and One LIME ELEVATOR and CONVEYOR for their No. 3 Purifying-House.

Copy of the Drawing, with Specification, may be obtained upon application to the Engineer, Mr. Fletcher W. Stevenson, on payment of 10s. 6d., which will be returned on receipt of *bonâ-fide* tender.

Sealed tenders, endorsed "Tender for Elevators," to e delivered (by post) to the undersigned at the Company's Offices, on or before Saturday, the 2nd day of March next.

The Directors do not bind themselves to accept the lowest or any tender.

HANBURY THOMAS,
General Manager.

Commercial Street, Sheffield,
Feb. 6, 1895.

SHEFFIELD UNITED GASLIGHT COMPANY.
NEEPSEND STATION.

TO IRONFOUNDERS, ETC.

THE Directors of this Company invite TENDERS for the manufacture and delivery (without erection) of RETORT-FITTINGS for 96 Retorts; also PLATES and GIRDERS for STAGE FLOOR for their No. 2 Retort-House.

Drawings may be seen and Bill of Quantities, with Specification and Form of Tender, obtained on application to the Engineer, Mr. Fletcher W. Stevenson, on payment of 10s. 6d., which will be returned on receipt of *bond-fide* tender.

Sealed tenders, endorsed "Tender for Retort-Fittings," to be delivered (by post) to the undersigned, at the Company's Offices, on or before the 2nd day of March next.

The Directors do not bind themselves to accept the lowest or any tender.

HANBURY THOMAS,
General Manager.

Commercial Street, Sheffield,
Feb. 9, 1895.

BOROUGH OF RICHMOND, SURREY.

WATER-WORKS AND PUBLIC BATHS.
TENDERS FOR
WELSH SMOKELESS STEAM COAL.

THE Town Council for the Borough of Richmond, Surrey, invite TENDERS for the supply of about 1500 tons of best WELSH SMOKELESS STEAM COAL, to be delivered, in Barges of about 40 tons, alongside the Wharf, opposite the Water-Works, Richmond, for One Year, from March 25, 1895. The Seam and District from which the Coal is to be supplied must be stated on the tender.

Particulars and Forms of Tender can be obtained of Mr. W. G. Peirce, Engineer at the Water-Works.

No tender will be recognized unless it is made on the prescribed form, properly filled up in every respect; and no expenses or claim will be allowed or paid to any person whether tendering or not. The security stipulated by the Public Health Act, 1875, for the due performance of the Contract will be required. The Contract and Bond will be prepared by the Town Clerk.

Sealed tenders, endorsed "Tender for Welsh Coals," and addressed to the Chairman of the Water-Supply Committee, Borough of Richmond, Surrey, must be delivered at the Town Clerk's Office by Ten o'clock on Tuesday, the 5th day of March, 1895.

The Council do not bind themselves to accept the lowest or any tender.

FREDK. B. SENIOR,
Town Clerk.

Clerk's Office: Town Hall, Richmond, Surrey,
Feb. 12, 1895.

FIRE-CLAY RETORTS, ETC.

THE Urban District Council of Buxton invite TENDERS for the supply of RETORTS, QUARRIES, BRICKS, CLAY, &c., for a period of Twelve Months.

Forms of Tender and Particulars may be obtained of Mr. Smedley, Gas Office, Town Hall, Buxton.

Tenders, endorsed "Tender for Retorts, &c.," to be addressed to the Chairman of the Gas Committee, not later than March 2.

By order,
JOSIAH TAYLOR, Clerk.

Town Hall, Buxton,
Feb. 7, 1895.

BROMLEY GAS CONSUMERS' COMPANY.

NOTICE is Hereby Given, that the ORDINARY HALF-YEARLY GENERAL MEETING of this Company will be held at the Bell Hotel, Bromley, Kent, on Thursday, the 28th day of February inst., at Six p.m. precisely, to receive the Report of the Directors, the Balance-Sheet confirmed by the Auditors, to declare Dividends, and for General Business.

The Transfer Books will be closed from the 14th to the 28th of February, 1895, both days inclusive.

By order of the Board,
HENRY W. AMOS,
Secretary.

Offices at the Works, Bromley, Kent,
Feb. 12, 1895.

HADDENHAM, ISLE OF ELY.

GAS WORKS AND PLANT
COMPRISING BRICK-BUILT AND SLATED COTTAGE,

Containing Five Rooms and Office, with Gas-Regulator, brick-built and slated Retort-House, with three 9-feet Retorts, Condenser, Scrubber, Purifying-House, with two Purifiers, Meter-House and Meter, with a capacity of 100,000 Cubic Feet, Gasometer with a capacity of 5000 cubic feet, and about One Rood of Freehold Land, situated close to the Great Eastern Railway Station. There are about 6660 yards of 4-inch and 2-inch Mains laid in the Streets, Nineteen Standard Street-Lamps, Fifty Meters, Five Syphon-Boxes, and the Entire Plant of the Haddenham Gas Company, Limited.

MESSRS. BIDWELL are instructed by the Mortgagee to SELL THE ABOVE BY AUCTION, at the Lamb Hotel, Ely (unless previously disposed of by private treaty), on Thursday, Feb. 28, 1895, at 4.30 o'clock in the Afternoon precisely.

For further Particulars and Conditions of Sale, apply to Messrs. EVANS AND SON, Solicitors, ELY; or to Messrs. BIDWELL, Land Agents and Surveyors, ELY, and 11, Bene Street, CAMBRIDGE.

NOTICE.

TO GAS ENGINEERS AND OTHERS.

MESSRS. CLAPHAM BROS., Limited, Keighley, Yorkshire, are no longer authorized to Manufacture my CONDENSER and WASHER-SCRUBBERS.

The above-named Gas Apparatus are erected and giving entire satisfaction at the following places: Neath, Lincoln, Sheffield, Ellesmere, Mountain Ash, Malden, Cullingworth, Montreal (Canada), Woodstock (South Africa), Cape Town (South Africa), &c.

These Appliances can now be obtained solely of the undersigned.

Winchester House, London, E.C. J. A. KELMAN.

NOTICE.

TO GAS ENGINEERS AND OTHERS.

CLAPHAM BROS., LIMITED, of Keighley, Yorks., beg to intimate that they are the SOLE MAKERS of LAYCOCK & CLAPHAM'S "ECLIPSE" WASHER-SCRUBBER, and that no person or persons beyond the Patentees and Makers have ever had any interest whatever in the Patent.

They are also the SOLE MAKERS of CLAPHAM'S PATENT IMPROVED "ECLIPSE" CONDENSER, as supplied to Bradford, Manchester, and other Gas-Works.

Orders and Inquiries promptly attended to. See advertisement in this week's JOURNAL, p. 404.

TENDERS wanted for 29 Fire-Clay RETORTS, BRICKS, and FIRE-CLAY.

JOSEPH PYM, Managing-Director, Gas Company, BELPER (Midland Line).

TOTTENHAM AND EDMONTON GASLIGHT AND COKE COMPANY.

NOTICE is Hereby Given, that the HALF-YEARLY ORDINARY GENERAL MEETING of the Proprietors in this Company will be held at the Company's Offices, Willoughby Lane, Tottenham, on Saturday, the 23rd day of February inst., at Half-past Three o'clock in the Afternoon precisely, to receive the Report of the Directors, the Statement of Accounts for the Half Year ended the 31st day of December, 1894, to declare Dividend, and to transact such other Business as the Act of Parliament directs.

The Transfer Books will be closed from Saturday, the 9th, until Monday, the 25th inst., both days inclusive.

By order of the Board,
JAMES RANDALL,
Secretary.

Offices of the Company,
Willoughby Lane, Tottenham,
Feb. 8, 1895.

TOTTENHAM AND EDMONTON GASLIGHT AND COKE COMPANY.
(INCORPORATED BY ACT OF PARLIAMENT.)

SALE OF STOCK.

MR. ALFRED RICHARDS is instructed by the Directors of the Tottenham and Edmonton Gaslight and Coke Company to SELL BY AUCTION, at the Mart, Tokenhouse Yard, in the City of London, on Tuesday, March 12 next, at Two o'clock in the afternoon precisely, £20,000 (being third portion) of "C" STOCK, in the following lots: 150 of £100, and 100 of £50. The sale is made under the Provisions of the Company's Act, 1882.

Particulars and Conditions of Sale, with a copy of Audited Accounts for 1894, may be had at the Company's Offices, Willoughby Lane, Tottenham; Messrs. Merriman, Pike, and Merriman, Solicitors, 25, Austin Friars, London; Messrs. H. E. Tatham and Co., Stock and Share Brokers, 3, Tokenhouse Buildings, London; or of Mr. Alfred Richards, Auctioneer, 18, Finsbury Circus, London, and 816, High Road, Tottenham.

By order,
JAMES RANDALL.

February, 1895.

ALEXANDER CAMERON,

CANNEL & GAS COAL MERCHANT,

48, WEST REGENT STREET,

GLASGOW.

HARCOURT'S COLOUR TEST.

For Carbon Bisulphide, Sulphuretted Hydrogen, and Carbonic Acid in Coal Gas.

The Materials for the above Tests may be obtained from

Mr. S. E. MILLER, 115, Cowley Road, Oxford.

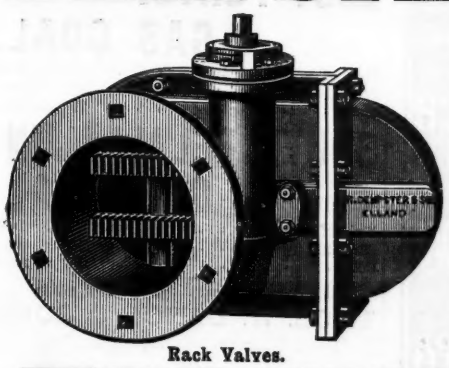
HEBBURN MAIN GAS COALS.

Yield of Gas per ton . . . . . 10,500 cub. ft.
Illuminating Power . . . . . 16·4 candles.
Coke . . . . . 68 per cent.

For prices, f.o.b. Ship or Delivered by Rail, apply to

THE WALLSEND & HEBBURN COAL COMPANY, LTD.,
B Lombard Street,
NEWCASTLE-ON-TYNE.
W. RICHARDSON, Fitter.

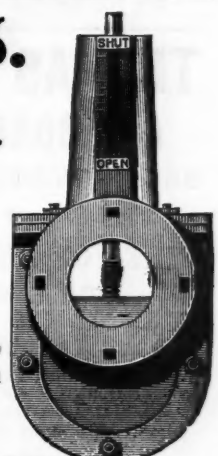
DEMPSTER'S VALVES.



Rack Valves.

Are of strong and substantial make.
Have Machine-Faced Flanges.
Have Mild Steel Spindles.
Are Tested before leaving Works.

All sizes of Rack, Screw, Double-Face, Disc, and Hydraulic Main Valves generally in Stock.



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Practical Makers of all kinds of Saturators, and Specialists in every description of Lead Work required in connection with Sulphate Plants.
Special attention to Repairs.
Improved Lead-Burning Machines,
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HOLMSIDE GAS COALS.

PRESENT DAILY PRODUCE OVER 4000 TONS.

LATEST ANALYSIS:—

Yield of Gas Per Ton . . 11,205 Cubic Feet.
Illuminating Power, $16\frac{7}{10}$ Stand. Sperm. Candl.
Coke (of good & pure quality) $13\frac{3}{4}$ Cwt. Per Ton.
Sulphur . . . . A little over 1 Per Cent.
Ash . . . . . Under 1 Per Cent.
Tar . . . . . 163 Lbs. (Avoir.) Per Ton.
Ammoniacal Liquor 103 Lbs. (Avoir.) Per Ton.

HOLMSIDE GAS COALS are supplied to the largest Gas Companies in England and on the European Continent; London alone consuming about half the produce.

SOUTH MOOR PELTON GAS COALS.

PRESENT DAILY PRODUCE AVAILABLE, 2500 TONS.

RESULTS OF DIFFERENT ANALYSES:—

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Illuminating Power . 17 Stand. Sperm Candl.
Coke (of excellent quality) . $13\frac{1}{2}$ Cwt. Per Ton.
Sulphur . . . . . 1·13 Per Cent.
Ash. . . . . 1·34 Per Cent.
Tar . . . . . 180 Lbs. (Avoir.) Per Ton.
Ammoniacal Liquor $94\frac{1}{2}$ Lbs. (Avoir.) Per Ton.

The HOLMSIDE and SOUTH MOOR COALFIELD possesses *a very great quantity of the best Coal;* and, whilst other Coal-Fields are becoming exhausted, this one is only being opened out, so that *the quality* of both the HOLMSIDE COALS, and the SOUTH MOOR COALS *may be relied upon for all practical purposes.*

These Coals may be bought through the Principal Merchants in England, or direct from

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Manufacture and keep in Stock at their Works (also large stock in London)

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NOTE.—Makers of HORSLEY'S PATENT SYPHONS. These are cast in one piece, without Chaplets; doing away with bolts, nuts and covers, and rendering leakage impossible.

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SILICA BLOCKS, BRICKS, AND CEMENT
OF SUPERIOR QUALITY
FOR GAS-FURNACES.

Trade Mark: "SILICA."

These Goods (largely used in Gas, Glass, Iron, and Steel Works) are, on account of their
GREATER DURABILITY,
Strongly recommended where EXCESSIVE HEATS have to be maintained.

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for
CANNEL & COAL.

TYNE
BOGHEAD
CANNEL.

Yield of Gas per ton . . . . . 13,155 cub. ft.
Illuminating Power . . . . . 38'22 candles.
Coke per ton . . . . . 1,301'88 lbs.

EAST PONTOP
GAS COAL.

Yield of Gas per ton . . . . . 10,500 cub. ft.
Illuminating Power . . . . . 16'3 candles.
Coke . . . . . 70 per cent.

SOUTH PELAW MAIN
GAS COAL.

Yield of Gas per ton . . . . . 10,500 cub. ft.
Illuminating Power . . . . . 15'3 candles.
Coke . . . . . 73'1 per cent.

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OR
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KENT'S THICK GAS COAL

RAISED AT

The Wharncliffe Woodmoor Colliery,

BARNSLEY.

Yield of Gas, nearly 12,000 *Cubic Feet per ton of Coal; and Illuminating Power, nearly* 17½ *Candles.*

The following is a complete ANALYSIS made by Mr. R. O. PATERSON, C.E., Gas-Works, Cheltenham:—

Specific Gravity (Water 1)	1·276
Weight of One Cubic Foot	79·700 lbs.

PROXIMATE ANALYSIS.

Moisture in Coal	2·68 per cent.
Volatile Matter	35·60 ,,
Fixed Carbon	58·80 ,,
Sulphur	0·96 ,,
Ash	1·96 ,,

COMMERCIAL ANALYSIS.

Gas per Ton of Coal	11,760 cub. feet.
Gas per Cubic Foot of Coal	418 ,,
Illuminating Power	17·44 candles.
Value of One Cubic Foot in Sperm	418 grains.
Value per Ton of Coal in Sperm	703 lbs.
Coke per Ton of Coal	1367 ,,
Coke	61·05 per cent.
Ash in Coke	3·21 ,,
Sulphur Eliminated with Volatile Products per Ton of Coal	9·4 lbs.
Sulphur in Coke per Ton of Coal	12 ,,
Ammoniacal Liquor per Ton of Coal	19·7 galls.
Tar per Ton of Coal	12·2 ,,

R. O. PATERSON, C.E.

Gas-Works, Cheltenham, 8th August, 1894.

For Price, &c., apply to

THE

Wharncliffe Woodmoor Colliery Co

LIMITED,

BARNSLEY.

BOLDON GAS COALS.

Worked by THE HARTON COAL CO., LTD.

Output about 3000 tons per day.

ANALYSIS—

Yield of Gas per ton	10,500	Cubic Feet.
Illuminating Power	16·9	Candles.
Coke	66·7	Coke.
Sulphur	0·86	Sulphur.
Ash	2·04	Ash.

Boldon Gas Coals are supplied under contract to

The Gaslight and Coke Company, South Metropolitan Gas Company, Imperial Continental Gas Association, European Gas Company, L'Union des Gaz (the Continental Union Gas Company), Crystal Palace District Gas Company, Bombay Gas Company, San Paulo Gas Company, Ipswich Gaslight Company, Newcastle Gas Company, Sunderland Gas Company, South Shields Gas Company, and to many other Companies at Home and Abroad.

For prices, &c., apply to the

HARTON COAL COMPANY,

LIMITED,

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NEWBATTLE CANNEL.

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FROM THE

MARQUIS OF LONDONDERRY'S COLLIERIES,

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Available output up to 5000 tons per day.
Yield of Gas 11,000 cubic feet per ton of Coal as per analysis by
Mr. John Pattinson, F.C.S., F.I.S.

FOR PRICES AND PARTICULARS, APPLY TO

S. J. DITCHFIELD,

SEAHAM HARBOUR, COUNTY OF DURHAM.

THORNLEY GAS COALS

WORKED BY THE

WEARDALE IRON AND COAL COMPANY, Ld.

OUT OF THEIR

THORNLEY AND WHEATLEY HILL COLLIERIES.

The Analysis made by Messrs. J. and H. T. Pattinson, Public Analysts for Northumberland, gives 10,500 cubic feet of Gas per ton, with an Illuminating Power of 16·3 Candles and 67·3 per cent. of Coke. The following is a Working Analysis made of these Coals by the Tudhoe and Sunderland Bridge Gas Company:—

[COPY.]

TUDHOE AND SUNDERLAND BRIDGE GAS COMPANY.

Tudhoe Gas-Works,
Spennymoor,
8th June, 1893.

Messrs. The

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GENTLEMEN,

For the last two months we have used your **THORNLEY GAS COAL** exclusively at these gas-works; and I have pleasure in herewith giving you the actual results obtained during the trial.

Yield of Gas per ton: 10,300 cubic feet.
Yield of Coke: 13½ cwt.

Illuminating Power of Gas, average of a series of tests, **17 Sperm Candles.**

The Coke was of excellent quality.

The following is a complete ultimate Analysis of the Coal.

	Per Cent.
Carbon	83·128
Hydrogen	5·116
Oxygen	7·401
Nitrogen	0·585
Sulphur	0·620
Ash	3·130
Water	0·020
	100·000

Analysis of the Coke.

Carbon	93·31
Sulphur	0·61
Ash	5·00
Moisture	1·08
	100·00

I am, Gentlemen,
Yours truly,
A. B. COWAN,
Manager.

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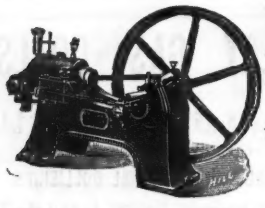

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1½-B.H. Power, with Governors, &c., only £28 10s., less liberal terms. Other sizes to 12-H.P. in proportion. Catalogue of Telephones, Bell Speaking-Tubes, Electric Bells, &c., 4d.

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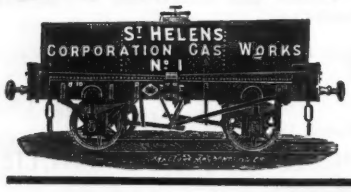

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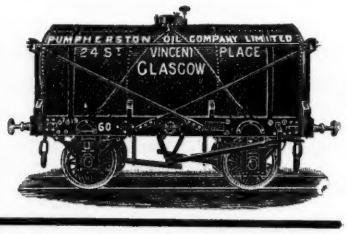

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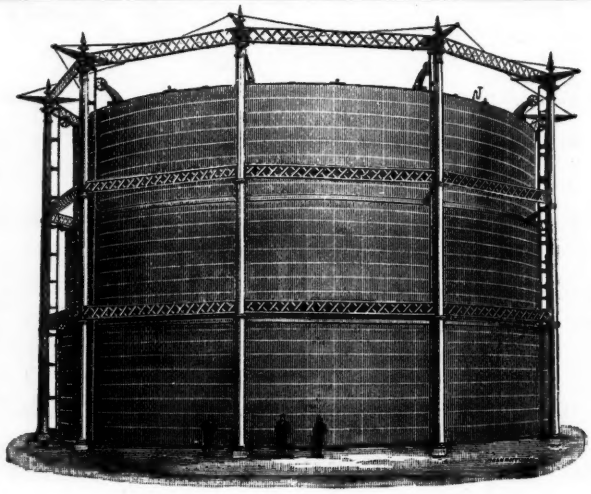

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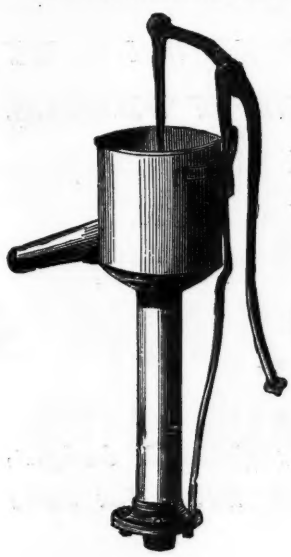

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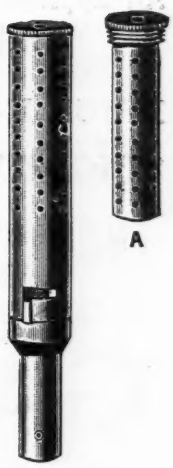

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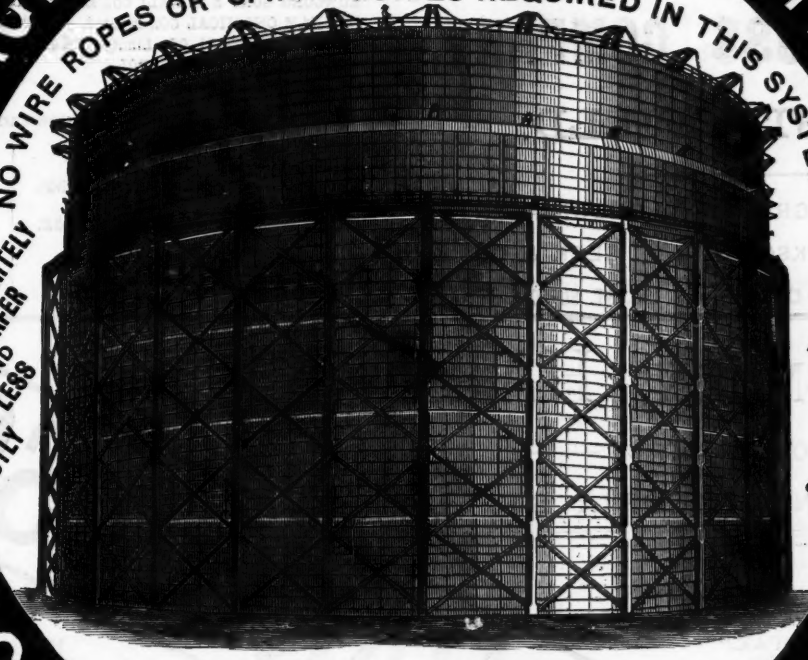

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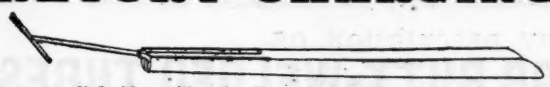

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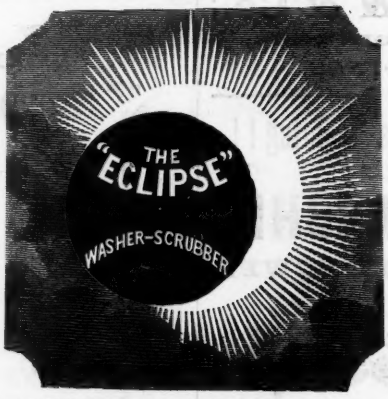

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